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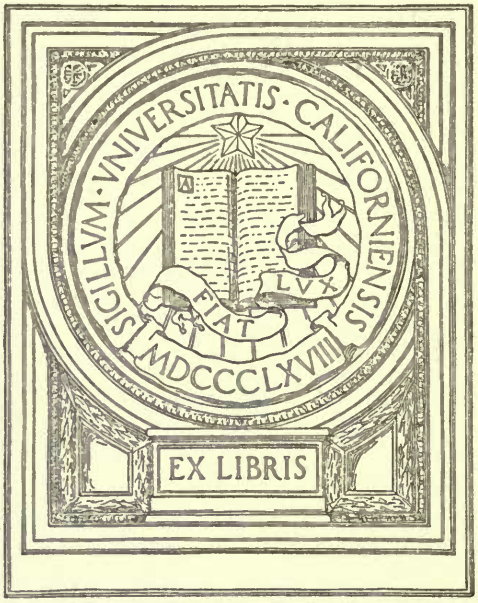

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Conchological Miscellany.

Vol. 100.

UNIV. OF CALIFORNIA

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X. *On the Relations of* Tanalia, Philopotamis, *and* Paludomus; *with a review of the Cingalese Species of the latter Genera. By* H. F. Blanford, *F.G.S. Communicated by* Dr. J. D. Hooker, *F.R.S., F.L.S., &c.*

(Plate XXVII.)

Read June 18th, 1863.

In a paper read at the meeting of this Society in June last, I expressed an opinion that the Cingalese genera *Tanalia* and *Philopotamis** are more closely related to *Melania* than has been held by several recent writers, and that in fact they should be regarded rather as sections of that genus than as distinct genera. The object of the first part of the present paper is to substantiate that view by showing that the opercula of *Philopotamis* and *Tanalia*, upon the structure of which generic distinction has been based, so far from being distinct in type, really present modifications of the subspiral operculum of *Melania*, from which the digression is serial and gradated in the different forms (species and varieties) included under those genera. While, however, insisting on the facts of affinity, I should at the outset so far modify the above general assertion as to admit that the question of genus and subgenus is to a great extent one of opinion, depending upon what amount of difference be held to constitute a family, genus, or subgenus. By those who regard such a form as *Melania variabilis*, Bens., with its largely spiral operculum, as a true *Melania*, *Philopotamis* and *Tanalia* should be treated as subgenera, their aberration in one direction from the type not being greater than that of *M. variabilis* in another direction. To those, on the contrary, who, with Messrs. Gray and Adams, regard most of the Lamarckian genera as families, *Philopotamis*, &c., will rank with the typical Melanias as nearly allied genera of one family.

In the second part of the paper I shall review the Cingalese species of *Paludomus* and *Philopotamis*; the latter genus is, so far as we know at present, restricted to Ceylon.

Part I.

It is unnecessary to review in detail the various opinions that have been expressed with regard to the affinities of *Tanalia*, *Philopotamis*, and *Paludomus*. The last-mentioned genus was distinguished from *Melania* by Swainson on account of the concentric structure of the operculum, and *Tanalia* and *Philopotamis* were subsequently separated therefrom by Gray and Layard, the former genus having a trigonal operculum with a marginal nucleus, the latter a subspiral operculum with a submarginal nucleus. *Paludomus*

* *Paludomus* was also included in this remark, but reconsideration leads me to regard it as more distinct than either of the above. See *postea*.

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conicus, Gray, *Tanalia aculeata*, Chemn., and *Philopotamis sulcata*, Reeve, sp., are quoted as the respective types of the genera.

Two other genera have been formed from the species herein included, viz. *Rivulina*, Lea, and *Ganga*, Layard; but there appears to be no distinction between the former genus and *Paludomus*, the two species quoted under it being, so far as I can judge from Mr. Cuming's authentic specimens, mere varieties of *Paludomus chilinoides*, Reeve, and *P. Tanjoriensis*, Chemn., while the latter is, as I have shown in my former communication, founded upon certain monstrous forms of *Tanalia aculeata*.

In the June Number of the 'Ann. & Mag. Nat. Hist.' for 1856, Mr. Benson pointed out that although the adult operculum of *Paludomus* has, as stated, a concentric structure, much resembling that of *Paludina*, with which the genus had consequently been classed by Dr. Gray, and subsequently by Mr. A. Adams, the embryonic operculum or the nucleus of the adult is spiral, resembling that of a *Melania*. He also remarked that the subspiral structure of the operculum of *Philopotamis* indicated an affinity with *Melania*, but expressed a doubt whether *Tanalia*, with its unguiculate operculum, should be referred to the Paludomidæ at all.

Now remembering that no essential difference of structure has been noticed in the animals of these genera, and that, with the exception of certain differences of habit, upon which I shall remark presently, the only assigned generic characters held to distinguish them from each other and from *Melania* are those of the operculum, let us see what these really amount to. Pl. XXVII. fig. 8 represents, on an enlarged scale, the operculum of a Ceylonese specimen of *Melania spinulosa*, Lamk., a common Eastern species, and, on the point in question, a fair representative of the genus. The structure is paucispiral, and the nucleus subbasal. Fig. 9 is the operculum of *M. lirata*, Bens., also enlarged: in this the structure is less distinctly spiral, and the nucleus is almost marginal and basal. In fig. 13, the operculum of *Tanalia violacea*, Layard, a subspiral structure is still apparent, but the nucleus is marginal and dextrally subbasal. The operculum of *Philopotamis decussata*, Reeve, fig. 10, only differs from this last in having the spiral structure more distinctly developed. And, finally, from *T. violacea* we pass to *T. aculeata*, fig. 14, in which a trace of a subspiral structure is only perceptible towards the nucleus; while from *Ph. decussata* we proceed through *Ph. sulcata*, fig. 11, to *Ph. globulosa*, figs. 12 *a* & *b*, which is the most aberrant form presented in the genus. We have thus tolerably perfect series from the typical *Melania* operculum to the extreme forms of *Philopotamis* and *Tanalia*. The operculum of *Ph. nigricans*, Reeve, is more nearly related to that of *Melania* than any of the above, and indeed some forms are scarcely distinguishable generically: fig. 15 *a* affords an instance of this; but in others again the *Philopotamis* structure is more developed (fig. 15 *b*).

It might seem at first sight that the operculum of *Paludomus* is, in an abstract morphological point of view, merely that of a *Philopotamis* with the nucleus pushed over towards the other side; but it is, I think, essentially different, or rather, the digression from the *Melania* type of structure has taken place in a different direction. The passage from *Melania spinulosa* to *Tanalia aculeata* may be regarded as a gradual unrolling of the opercular spiral, which becomes nearly obsolete by successive gradations, while in

Philopotamis a similar modification obtains to a less extent, accompanied in *Ph. globulosa* with an incipient concentric growth. In *Paludomus*, on the other hand, the growth of the operculum is, up to a certain point, that of a typical *Melania*: after the formation of one and a half or two whorls it suddenly takes a different direction, and is superseded by a strictly concentric growth, in which the chief addition is in the direction of the outer or dextral margin instead of the inner as in *Melania*, *Philopotamis*, and *Tanalia*. It would be arguing in a circle, and on an unproved generalization, to adduce the comparatively wide range of *Paludomus*, as contrasted with that of *Philopotamis* and *Tanalia*, in support of their generic diversity, on the supposition that successive gradations of structural character argue successive appearance in time, and that the earlier forms have the wider range; but if the structural argument appear valid, the facts of range will have much significance to those who admit the possibility of generic derivation from preexisting types.

The solid structure and depressed form of the shells of *Paludomus*, *Tanalia*, and *Philopotamis* may be held to indicate a closer relationship between these genera than exists between any one of them and *Melania*. In these respects, however, the true Melanias exhibit much variety. *Paludomus brevis*, D'Orb., is a *Melania* as regards its operculum, although the shell has, on account of its form, been erroneously referred to *Paludomus*; and the *Melania Hugelii** of S. India is almost as thick and depressed as certain *Paludomi*. The genus *Gyrotoma* also, with the operculum of *Melania*, has the solid, depressed form of *Paludomus*, yet would scarcely be classed therewith.

With respect to habit, no marked line can be drawn between the different genera in question. *Tanalia aculeata* is indeed never found in still water, nor, I believe, elsewhere than in mountain streams; but it is met with in the smallest perennial streamlets as well as in the largest torrents: it is generally found adhering to rocks, but also frequently crawling over sandy bottoms. *Philopotamis globulosa* has a similar range of habit, but is apparently more restricted in geographical range. I have myself only met with it in the Mahavelli Ganga and tributaries, and in the stream of the Balcadua Pass, nor have I seen any specimens from the southern or eastern watershed of the hills. *Ph. sulcata* occurs chiefly in the smaller streams on and among the hills, extending from an elevation but little above the sea to a height of 3000 feet. Mr. Layard records that this species sometimes climbs far out of the water; but, though I do not question his accuracy, I do not remember ever to have met with it myself in such a situation. The species of *Paludomus* are, as their name imports, the most marsh-loving in their habits; but *P. chilinoides* and *P. Tanjoriensis*, the only species I have myself collected, though occurring in marshes and tanks, are at least equally or even more common in streams and rivers, of both slow and rapid flow, on the hills and in the low country.

* This species is from the upper waters of the Cauvery, where it has been rediscovered by Dr. Jerdon. The quoted habitat, New Holland, is probably erroneous.

Part II.

Genus Melania, Lamk.

Subgenus Philopotamis, Layard.

Five species of this genus are known to me, one of which, *P. regalis*, Layard, is doubtful, and may hereafter prove to be merely a variety of *P. sulcata*: of another, *P. decussata*, Reeve, I have only seen the three specimens in Mr. Cuming's collection, and, in a genus exhibiting so much specific variation as the present, a much larger series is necessary to convince me of specific distinction. The other three species are more distinct from each other than is usual in the case of the allied subgenera, and differ to some extent in their opercular structure, as well as in the form, &c. of their shells. Each of these species is variable, and one includes several forms which have been described as distinct. The following is a list of the species provisionally admitted by me :—

P. sulcata, Reeve.
P. regalis, Layard.
P. globulosa, Gray.
P. nigricans, Reeve.
P. decussata, Reeve.

Philopotamis sulcata, Reeve. (Pl. XXVII. figs. 5 *a–c*, 11.)

Shell ovately conic or conic, more or less strongly sulcate; sulcations regular, frequently minutely decussated by transverse striæ, sometimes nearly obsolete. Epidermis citrine to dark brown or reddish brown, concealing the proper colouring of the shell, which consists sometimes of irregular zigzags, more or less interrupted, and tending towards a spiral arrangement; more frequently of spiral bands, interrupted or continuous. Spire elevated, varying in height, always eroded. Upper whorls (rarely more than three remaining) variable in convexity, rounded or flattened. Last whorl globose or (rarely) conoidal. Aperture gibbous to obliquely pyriform. Outer lip denticulated. Inner lip thinly callous: columella flattened, arcuated, and somewhat everted, sometimes tinted with brown. Operculum ovately pyriform, varying in width, obsoletely spiral: nucleus very near the dextral margin, somewhat variable in position.

This species is the type of the genus. The shell is always Paludiniform, but varies in globosity even in a series of specimens from the same spot. Pl. XXVII. figs. 5 *a* & *b* are two specimens from the same stream at Avisavella, the first being the most tumid form I have seen. Fig. 5 *c* is a very conical form, from Hautanne, a hill in the neighbourhood of Kandy. In fig. 5 *a* it will be seen that the sutures are deep, the upper part of the whorl sloping off much less obtusely than in fig. 5 *b*. Other specimens in my collection present intermediate gradations, so that it is impossible to regard these differences as other than specific variations. The spiral sulcation, from which the species derives its name, is usually fine and regular, and in some specimens is seen under the lens to be regularly decussated with striæ of growth. In other specimens these last are obsolete, as is occasionally the spiral sulcation also to a great extent, at least on the last portion of the body-whorl. The upper whorls are always more or less eroded.

The painting of the shell varies greatly. In a specimen from Avisavella the whole is

covered with a zigzag marbling, but more frequently this is broken up into interrupted spiral bands, and in other specimens, again, the bands are continuous, resembling those which characterize *P. bicincta*, but narrower and more numerous. The colouring is only visible in the interior, and, in old specimens, is concealed beneath a white callous deposit of the mantle. The edge of the peristome is generally, but not always, tinted with brown.

The operculum is normally as figured in Plate XXVII. fig. 11, but, as in the case of *Tanalia*, is not unfrequently destroyed, and replaced by one having a concentric structure. If this takes place at an early age, the nuclear portion of the operculum is alone so formed, the later-formed layers having the usual arrangement. I found that, in a stream at Hautanne, more than half the specimens had lost portions of their opercula, and one or two full-grown shells were totally divested of this appendage. The shells of these specimens were also eroded in holes in a manner difficult to account for.

PHILOPOTAMIS REGALIS, Layard.

This appears to be a rare shell. I saw no specimens of it in Major Skinner's collection, nor have I met with it myself in Ceylon. The only specimens I have seen were those in Mr. Hugh Cuming's collection, obtained, I believe, by Mr. Thwaites. I am thus unable to add anything to Mr. Layard's description from my own observations; but I may remark that it appears to differ in no respect from *P. sulcata*, except in possessing a row of small scale-like spines round the upper edge of the whorl. I cannot but think that it may eventually prove to be a variety of *P. sulcata*.

PHILOPOTAMIS GLOBULOSA, Gray. (Pl. XXVII. figs. 1 *a–e*, 12 *a*, *b*.)

P. abbreviata, Reeve; *P. bicincta*, Reeve; *P. clavata*, Reeve.

Shell globose or ovate, solid, smooth, rarely bearing faint traces of spiral sulci. Epidermis yellowish brown. Shell colourless, or ornamented with two or three spiral bands, only visible in the interior of *adult* shells. Spire depressly conical, variable in height; apex usually eroded. Whorls flattened, the last more or less elongated, depressly flattened above, produced below. Aperture semi-ovate to obliquely pyriform, subcanaliculate behind, lined interiorly with a callus, sometimes tinted yellow towards the exterior margin. Outer lip sharp. Columella callous, arcuated towards the front. The callus continuous to the junction of the outer lip. Operculum obliquely pyriform, obsoletely spiral, subconcentric: nucleus rather variable in position near the dextral margin, and from $\frac{1}{5}$th to $\frac{2}{5}$ths the height of the operculum.

The shell of this species is always yellowish brown (the colour of the epidermis), and shows less tendency to variation than most of its allies. The chief points of variation observable are—the form, which is sometimes globose, sometimes elongate (but exhibiting all intermediate gradations); and the painting, which is sometimes developed, more frequently not, and in the former case only in the interior of the adult shell. Two extreme forms have been described as *P. globulosa* and *P. bicincta*, but the comparison of even a moderate series from Kandy, Ambegammoa, and the Balcadua Pass is sufficient, I think, to convince any one that they are specifically identical. In some small specimens

from Peradinia, near Kandy, the upper whorls are in certain of the specimens somewhat exserted, but only to a slight degree. In the more elongate forms the slight flattening and angulation of the upper part of the whorls which characterize the more globose specimens tend to become obsolete.

Coloured specimens, which are almost always young shells, have sometimes two, sometimes three bands.

The operculum of this species is characterized by its more pyriform shape than that of *Philopotamis sulcata*, and by the nucleus being further from the margin. The position of the latter is somewhat variable (see fig. 12 *a*, *b*).

Paludomus olivaceus, Reeve, from Sumatra, bears much resemblance to this species; but, in the absence of its operculum, no safe conclusion can be drawn.

PHILOPOTAMIS NIGRICANS, Reeve. (Pl. XXVII. figs. 3 *a–e*, 15 *a*, *b*.)

Shell of type-form, thick, elevately conical (apical whorls almost invariably eroded), ornamented with close-set granular striæ, those near the suture more developed than the rest. Colour of epidermis dark citrine to black. The shell painted with numerous wavy brown bands, generally visible only in the interior, and sometimes obsolete near the aperture. Spire, when perfect, acutely conical; whorls about six, rarely more than three remaining in eroded shells, flattened, with shallow sutures. Last whorl more or less angulate at the periphery, obliquely flattened beneath. Aperture obliquely ovate, pointed above. Peristome white or greyish white, callous: outer lip sharp, even: columella slightly arcuated anteriorly. Operculum paucispiral: nucleus rather large, transversely central, and at from $\frac{1}{4}$th to $\frac{2}{5}$ths of the height.

Var. α. (The only specimens found, not fully grown.) Shell in form as above, uneroded, smooth, with one or two strong striæ only near the suture. Epidermis transparent, citrine, with the markings of the shell distinctly visible through it.

? Var. β. Form of shell as above, but more elongate. Shell smooth, colourless or with the bands broken up into a series of square dots. Last whorl elongate, the angulation nearly or quite obsolete (Pl. XXVII. fig. 3 *e*).

This species is more nearly allied to *Melania*, both in form and in the structure of the operculum, than any of its allies. From *P. decussata*, the only congener to which it bears any near resemblance, it is distinguished by its more conical form, the angularity of the last whorl, and the character of the marking, as well as, in the majority of specimens, by the granular surface, which, so far as I have seen, is peculiar to this species.

The type-forms and the var. α. were collected by myself in large numbers (associated with *Tanalia violacea*) in some small mountain streams near Huckgalle, at an elevation of 5000 feet. With regard to var. β, I am in some doubt whether it really belongs to this species, notwithstanding that var. α, and a single colourless specimen of the normal form given me by Mr. Cuming, seem to link it with the type. The only specimens I have seen were in Mr. Cuming's collection, where they were erroneously referred to *Paludomus palustris*, and none of the specimens contained opercula. In the absence, however, of any adverse evidence, I provisionally regard this as a variety of *P. nigricans*.

P. nigricans has been collected by Mr. Gardner near Adams Peak, at an elevation of 6000 feet, by Mr. Thwaites in the Black Pool at Nuora Ellia (7000 feet), and by M. Humbert* in the Paudel Oya Valley. The specimens quoted by Mr. Layard, from the Balcadua Pass, do not belong to this species. Its range appears to be restricted to the higher parts of the hills.

PHILOPOTAMIS DECUSSATA, Reeve. (Pl. XXVII. figs. 6, 10.)

Shell ovate-conical, smooth (or decussate ?). Epidermis citrine; shell ornamented with two broad spiral bands of colour, with a narrow interspace on the periphery. Spire rather small, acute, elevately conical. Whorls 5, the upper somewhat flattened, the last large, somewhat cylindrical. Aperture ovate, pointed above, equal to $\frac{3}{5}$ths the height of the shell. Peristome white. Operculum obliquely pyriform: nucleus small, spiral, close to the outer margin, subbasal.

The only specimens I have seen of this shell are those in Mr. Cuming's collection, which I take to be authentic, notwithstanding the absence of decussate sculpture; and I am unable to say how far, and in what direction, the form, &c., of the species varies. It appears to be distinct, but it must be admitted that, seeing the great variability of most of its congeners, it would be premature to separate it otherwise than provisionally until a much larger series has been examined. Pl. XXVII. figs. 6 & 10 represent one of Mr. Cuming's specimens, and its operculum enlarged.

Genus PALUDOMUS, Swainson.

This genus, as restricted by the separation of *Philopotamis* and *Tanalia*, is characterized by the concentric structure of the adult operculum, and a spiral nucleus situated about the middle of its height, and nearest to the left margin. The geographical range of *Paludomus* is much greater than that of either *Philopotamis* or *Tanalia*, including not only Ceylon, India, and Birma, but also extending in one direction to Egypt, Cape Guardafui, the Mauritius, and the Seychelles, in the other to Java, Sumatra, and the Island of Timor. It is remarkable, too, as contrasted with the above genera, that the species have in some cases a very extensive range, following in this respect certain of the low-country species of *Melania*, whose habit is similar, and that throughout the genus the form and structure of the operculum are, so far as I have observed them, very constant.

The species of true *Paludomus* enumerated from Ceylon are pretty numerous, but a careful comparison of the types in Mr. Cuming's cabinet, aided by those specimens which I have myself collected, or examined in Major Skinner's and Mr. F. Layard's collections, has convinced me that they are all reducible to two species, viz.,

P. chilinoides, Reeve.
P. Tanjoriensis† (scil. *Tanschauriensis*), Gmelin.

* These specimens are stated by Dr. Brot (Cat. d. Melaniens) to be in part smooth, in part granulated, but identical in form.

† I have taken the liberty of altering the orthography of this name to a form more in accordance with the modern spelling of the place after which it is named.

PALUDOMUS CHILINOIDES, Reeve. (Pl. XXVII. figs. 4 *a–f*.)

P. constrictus, Reeve; *P. phasianinus*, Layard (not Reeve); *P. lævis*, Layard; *P.* (*Rivulina*) *Zeylanica*, Lea; *P. fulguratus*, Dohrn; *P. nasutus*, Dohrn.

Shell thick, ovate or ovate-conic, smooth (rarely having traces of spiral sulci on the upper part of the whorls). Colour of epidermis citrine or citrine yellow. Shell ornamented with spiral bands of brown crow's-feet markings, which sometimes coalesce into transverse zigzags (*P. fulguratus*), sometimes, but very rarely, into longitudinal (spiral) bands. Spire always exserted, sometimes elevated. Whorls 5, all rounded, obliquely flattened above; upper whorls more or less eroded; last whorl ventricose. Sutures impressed. Aperture ovate, flattened on the columellar side, angulate above. Outer lip sharp: inner lip callous, usually white, rarely citrine-tinted on the edge. Interior of aperture lined with white callus in old shells. Operculum with small spiral nucleus, about central on the longitudinal axis, at about $\frac{1}{3}$rd of the transverse axis from the sinistral margin.

In the above description I have briefly indicated the chief points in which *P. chilinoides* is variable. The most striking of these are the elevation of the spire and the markings of the shell; but the differences observable in the latter are not so great as to lead to any doubt of the specific identity of the specimens in question. To illustrate the variation of form I give a selected series, Pl. XXVII. figs. 4 *a–f*, of which fig. 4 *a* is from an unknown locality in Ceylon, figs. 4 *b* and 4 *c* from Peradinia near Kandy, and the remainder from a stream at Ballepane, on the Colombo and Kandy road. From these it will be seen that, as in the case of *Tanalia aculeata*, specimens from the same locality vary somewhat in form, but in order to ascertain the full extent of variation a wider selection is necessary. This series also exhibits a certain amount of variation in point of size, but not to the full extent actually observed. I have not, indeed, met with any much larger specimens, but smaller shells than fig. 4 *a* are occasionally to be met with, though rare.

I distinguish this species from *P. Tanjoriensis* chiefly by the smoothness of the upper whorls, and by the inferior height and the obtuseness of the spire, which is generally eroded. The whorls in all varieties of *P. chilinoides* are smooth; and though sometimes subangulate, owing to the flattening of the upper surface, they never have anything like the sharp keel which distinguishes the apical whorls of most varieties of *P. Tanjoriensis*. Moreover, *P. chilinoides* never exhibits that distinct margination of the sutures which is almost invariable in the other species. I have never noticed more than five whorls in *P. chilinoides*, while *P. Tanjoriensis* has sometimes as many as eight. Varieties occur upon which it is difficult to pronounce satisfactorily, but the great majority of the specimens are so well marked that I have little or no doubt of their specific distinctness.

The range of *P. chilinoides* appears to be confined to the southern provinces of the island—at least I have met with no specimens among the shells received from the northern plains. This species is found in streams of all sizes, generally on sand and mud, and is frequent in small sluggish brooks as well as in those of more rapid flow.

The animal is of a dark slate-colour, nearly black on the sides of the foot, muzzle, and

tentacles. The foot is lyre-shaped, broadest in front, with a round anterior margin, and very obtuse behind. In creeping, the muzzle, which is slightly notched, is pushed in front of the foot, the extremity only and the tentacles being protruded beyond the shell. The eyes are small, and placed externally at the base of the tentacles. The dorsal fold of the mantle is ornamented with a fringe of black filaments.

PALUDOMUS TANJORIENSIS, Gmelin, sp. (Pl. XXVII. figs. 2 *a–e.*)

P. acutus, Reeve; *P.* (*Rivulina*) *modicella*, Lea; *P. spiralis*, Reeve; *P. spurcus*, Souleyet; *P. lutosus*, Souleyet; *P. parvus*, Dohrn; *P. palustris*, Layard; *P. obesus*, Layard.

Shell elevately conical, smooth with obsolete sulci on the lower whorls, grooved and generally carinated on the upper whorls, which are perfect or but slightly eroded. Epidermis citrine. Shell colourless, or marked with spiral rows of brown dots, which sometimes on the lower whorls, and nearly always on the upper, coalesce into irregular transverse bands of colour. Spire variable in height, sometimes concave, acute, consisting of seven or eight whorls when perfect, of which two or three are sometimes eroded. Sutures deep, those of the last whorl, or whorls, marginate. Upper whorls angular: last whorl ventricose, flattened above towards the mouth, usually marked with two to five linear sulci on the periphery. Aperture gibbous ovate, pointed above. Peristome white, continuous: outer lip sharp, even: columella callous.

Like most of the *Paludomi*, *P. Tanjoriensis* varies considerably in the elevation of the spire, as is shown by the series of specimens (all from Ceylon) figured. Another series from a small stream near Tindevanum in S. Arcot exhibit almost as great a range of variation, although all collected within the space of a few yards. The development of the spiral grooving of the upper whorls is very different in different specimens, and only the first two or three whorls are distinctly carinated. These characters, however, together with the acuteness of the spire, the deep sutures, and the dotted typical marking, well characterize the species, and distinguish it from *P. chilinoides*.

The range of *P. Tanjoriensis* is very wide. It commences on the northern limit of that of *P. chilinoides* at some miles from the hills, and ranges over the low country of Northern Ceylon. It is common in the plains of the Carnatic, and I have found it in the neighbourhood of Madras in paddy-fields, and in irrigation-channels at Poonamallee. It is not yet recorded from the northern part of the Madras Presidency, but is found in Central India and Bombay (*P. obesus*, *P. parvus*). The *P. lutosus* of Souleyet, which, as I am informed by Mr. Benson, was taken in the Hoogly, is absolutely undistinguishable from the typical form; and in Mr. Cuming's collection are some specimens of the same form, the history of which I do not know, but which are labelled as from Cashmere.

Of all the species with which I am acquainted, *P. Tanjoriensis* most resembles such Melanias as *M. fasciolata*, Oliv., in habit, and it is essentially a species of the plains. It is common on the sandy beds of rivers and in small perennial streams, and I have above noticed its occurrence in the irrigation-channels of paddy-fields. I have also received from Major Skinner specimens from a tank in Northern Ceylon. To this peculiarity of habit it is probably owing that its range is so much wider than that of

most *Paludomi*, for it is a general rule that low-country species of Mollusca have a wider geographical range than those which are peculiar to the hills*.

The animal of the Hoogly form has been figured by M. Souleyet ('Voyage de la Bonite') and copied by Mr. Adams in his 'Genera of the Mollusca.' Unfortunately I omitted to notice the characters of the South Indian form (*P. acutus*, Reeve, and type of Gmelin), the only one I have myself collected, and I am unable therefore to add anything from my own observations.

DESCRIPTION OF THE PLATE.

Plate XXVII.

Fig. 1 *a–e*. Series of *Philopotamis globulosa*, Gray: *a*, *b*, from Ambegammoa; *c*, *d*, *e*, from Peradinia.
Fig. 2 *a–e*. Series of *Paludomus Tanjoriensis*, Gmelin, sp., from the Northern Province, Ceylon.
Fig. 3 *a–e*. Series of *Philopotamis nigricans*, Reeve: *a*, *b*, from Huckgalle; *c*, from Mr. Benson's collection; *d*, *e*, from Mr. Cuming's collection.
Fig. 4 *a–f*. Series of *Paludomus chilinoides*, Reeve: *a*, from Major Skinner's collection; *b*, *c*, from Peradinia, Kandy; *d*, *e*, *f*, from Ballepane.
Fig. 5 *a–c*. Series of *Philopotamis sulcata*, Reeve: *a*, *b*, from Avisavella; *c*, from Hautanne, Kandy.
Fig. 6. *Philopotamis decussata*, Reeve, sp., from Mr. Cuming's collection.
Fig. 7. Operculum of *Melania variabilis*, Benson: from Birma. (Enlarged 2 diameters.)
Fig. 8. Operculum of *M. spinulosa*, Lamarck: from Kandy. (Enlarged 2 diameters.)
Fig. 9. Operculum of *M. lirata*, Benson: from Calcutta. (Enlarged 2 diameters.)
Fig. 10. Operculum of *Philopotamis decussata*, Reeve, sp.: from Mr. Cuming's collection. (Enlarged 3 diameters.)
Fig. 11. Operculum of *Ph. sulcata*, Reeve, sp.: from Major Skinner. (Enlarged 3 diameters.)
Fig. 12 *a*, *b*. Opercula of *Ph. globulosa*, sp.: from Ambegammoa. (Enlarged 2 diameters.)
Fig. 13. Operculum of *Tanalia violacea*, Layard, sp.: from Huckgalle. (Enlarged 3 diameters.)
Fig. 14. Operculum of *T. aculeata*, Gmelin, sp.: from Ambegammoa. (Enlarged 1½ diameter.)
Fig. 15 *a*, *b*. Opercula of *Philopotamis nigricans*, Reeve, sp.: *a*, from Huckgalle; *b*, from Mr. Benson's collection. (Enlarged 4 and 3 diameters respectively.)
Fig. 16. Operculum of *Paludomus regulatus*, Benson: from Ava. (Enlarged 2 diameters.)

N.B. The form being the chief object of illustration, the colouring of the shells has been omitted in those few specimens which exhibit markings. The shells are all of the natural size.

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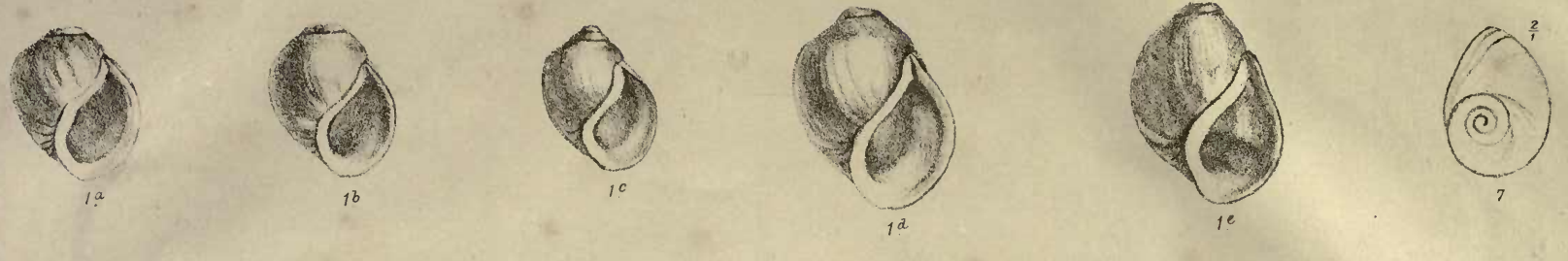
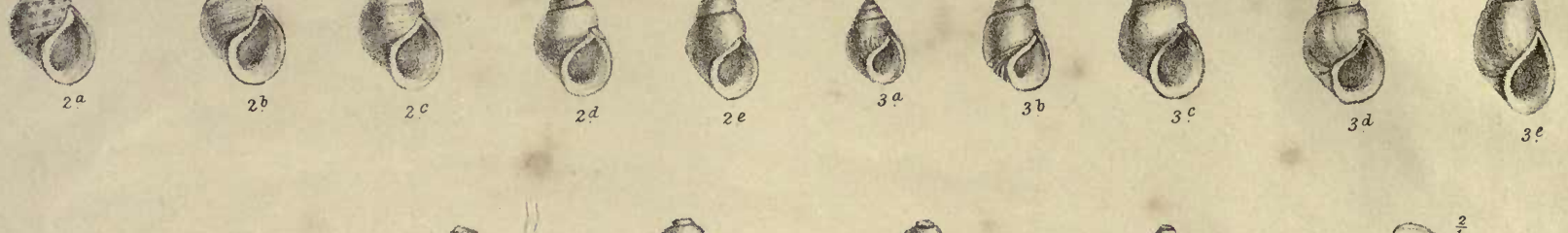
* Mr. Darwin's suggestion as to the mode of dispersion of freshwater Mollusca, plants, &c., will probably apply here. The stations occupied by *P. Tanjoriensis* are precisely those most frequented by water-fowl.





UNIV. OF CALIFORNIA

CANADIANA

BINNEY

REPORT UPON LAND SHELLS COLLECTED ON THE SURVEY.

7886

Dwp

cerpted from the Report of Lieut. Henry L Abbott upon Explorations for a Railroad Route from the Sacramento Valley to the Columbia River made by Lieut. R.S. Williamson assisted by Lieut. H.L. Abbott. 1855.

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No. 3.

REPORT UPON THE LAND SHELLS COLLECTED ON THE SURVEY.

BY W. G. BINNEY,

MEMBER OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

The terrestrial mollusks of the Pacific region of the United States are entirely distinct from those of any portion of the Union east of the Rocky mountains. No species has, as yet, been detected on both sides of this insurmountable barrier. The types, also, are quite different. Instead of the fragile, horn colored shell of our western States, the shells are large, solid, and endowed with the rich coloring of the tropical species. Our knowledge of them is still very imperfect. Future research will probably bring to light many new species and interesting facts relating to their habits and their geographical distribution.

The helices of California and Oregon are characterized by a very peculiar indentation and granulation of their surface, and often by the presence of a broad, revolving band on the body whorl. This latter peculiarity exists in one-half of the species hitherto observed.

None of the shells brought by this expedition are new to science. I have, however, given full descriptions of all, as those that have been published are very brief, and some have not been noticed by American authors.

The measurements are given in millimetres, the French system being the most convenient and the one generally adopted by European naturalists.

No. 1. HELIX FIDELIS, Gray.

Testa subconica, solida, alba, castanea aut nigra, striata, et lineis volventibus induta; spira elevata; anfr. 7 regulariter accrescentes, fasciâ nigrâ aut castaneâ cincti; sutura impressa; subtus convexa, lævigata, nigra, profunde umbilicata; apertura depresso-rotundata, intus fasciata; columella callo levi induta; labrum album aut fuscum, ad umbilicum reflexiusculum.

SYNONYMS AND REFERENCES.

Helix fidelis, Gray, Proc. Zool. Soc. p. 67, anno July, 1834.
Chemnitz, ed. 2, p. 321, t. LVII, f. 12–13.
Pfeiffer, Monog. Hel. Viv. I, p. 338—Ib. III, p. 229.
Reeve, Con. Icon. No. 657.
Helix nuttalliana, Lea, Am. Phil. Soc. VI, 88; pl. xxiii, f. 74, anno December, 1834.
Binney, Boston Journ. Nat. Hist. III, 369; pl. xii.
Terrestrial Mollusks, II, 159, III; pl. xviii.
Dekay, Nat. Hist. New York, p. 46.

DESCRIPTION.

Animal.—Color, dull ochre, slaty towards the tail. Coarsely granular upon the neck; but from a line running from the dorsal line, where it issues from the shell to the mouth, the granules diminish, and are succeeded by coarse, undulating, interrupted ridges, radiating in every direction from the aperture, and terminating in a line nearly marginal; edge simple.

Shell.—Subconic, with seven slightly rounded whorls, regularly and gradually diminishing in breadth from the base towards the apex; apex obtuse, suture distinctly impressed. Below, flattened, convex, with a deep umbilicus, about one-eighth the smaller diameter of the shell. Aperture ovate, regularly rounded. Lip thickened, white, red, or lilac colored, reflected only below, in some individuals entirely concealing the umbilicus. Columella with a light callus. Epidermis shining, covered with numerous fine, revolving lines. Striæ of increase distinct, but very slightly elevated.

There are several varieties of coloring. The base is uniformly dark, but varies from chestnut color to jet black. Upon the body whorl is a broad revolving black band, enclosed above and below by one of lighter color, white or chestnut. These bands are obsolete in the three whorls nearest the apex. The upper surface is white, light chestnut, or dark brown, in some individuals relieved by irregular patches of black. On some specimens there are faint tracings of intermediate bands, while some are entirely destitute of any bands.

Greatest diameter, 36; lesser, 31; altitude, 19 millimetres.

Geographical distribution.—Collected by Dr. J. S. Newberry, at Portland, Oregon Territory. It has not been found, except in the vicinity of Fort Vancouver, by others, but seems rather a common species in that region.

Remarks.—This is the largest and finest of the helices of the Pacific coast. It may at once be recognized by its large size and shining, variegated surface, on which the revolving black line contrasts so strongly with the lighter color of the epidermis.

No. 2. HELIX INFUMATA, Gould.

Testa depressa, biconvexa, carinata, lenticularis; nigra, apice rufa; anfr. 6–7 rugis incrementalibus et punctis numerosis minutis tumidis asperati; sutura impressa; apertura depressa, obliqua, intus lilacina; perist. lilacinum, incrassatum, subtus reflexiusculum, umbilicum profundum fere tegens.

REFERENCE.

Helix infumata, Gould, Proc. Boston S. N. H. V, p. 127, anno February, 1855.

DESCRIPTION.

Animal.—Not hitherto observed.

Shell.—Subconic, the upper and lower surfaces equally convex, separated by a decided, though obtuse, carina, which gives the shell a lens-like shape. Epidermis uniformly black, excepting on the four upper whorls, which are light red. Suture distinctly impressed; whorls, 6, with coarse wrinkles of growth, crossed by fine, almost imperceptible revolving lines, and roughened by small elevated points or tubercles. Below, these points are much more numerous and crowded, the revolving striæ obsolete, and incremental wrinkles much less developed. Umbilicus small in proportion to the size of the shell, being only one-fifth the lesser diameter, and almost entirely concealed by the reflected lip. Aperture ovate, flattened, with a slight

angle at the carina. Lip thickened, reflected only at its junction with the body whorl, near the umbilicus. There is a slight deposition of callus on the columella. Throat and lip lilac colored.

Greatest diameter, 37 ; lesser, 32 ; altitude, 18 millimetres.

Geographical distribution.—Found by Dr. Newberry, on the hills near San Francisco, California. Has not, as yet, been detected in any other locality.

Remarks.—In general appearance it is most nearly allied to *H. fidelis*, Gray. It has not, however, the revolving bands, and is at once recognized by its lenticular shape. From all the other described species of the western coast it is readily known by the peculiar protuberances which crowd the epidermis. Dr. Gould compares it in general form to *H. plicata*, Born. It must be a rare species. But one mature specimen was brought, which is the only one I have ever seen, with the exception of a single shell in the collection of Mr. Thomas Bland, of New York.

No. 3. HELIX OERUGINOSA, Gould.

Var. β.

Testa globosa, solida, maximè elevata; castanea, maculis irregularibus olivaceis longitudinalibus et fasciâ rufâ volvente variegata; anfr. 7 convexi, indentati, et minutissimè granulati, spira conica, elevata ; sutura impressa ; subtus inflata ; apertura depresso-rotundata, intus fasciata ; labrum album, ad umbilicum profundum et fere tectum, reflexiusculum.

SYNONYMS AND REFERENCES.

Helix æruginosa, Gould, Proc. Boston, S. N. H. V., p. 127, anno Febr., 1855.

DESCRIPTION.

Animal not yet observed.

Shell.—Heavy, subglobose, conic, with a very elevated spire. Whorls seven, rounded, the last quite ventricose, with a narrow black revolving line, which becomes concealed by the sutures of the upper whorls ; suture well defined, impressed. Below subglobose, aperture ovate, with a white thickened lip, reflected only at the deep umbilicus, which it nearly conceals. Columella with a light callus, epidermis yellowish, broken by irregular, zigzag, rufous blotches, running parallel to the incremental wrinkles. Surface smooth, unbroken by the striæ of increase, which are not prominent, and indented as in *H. Townsendiana*. There are also microscopic granulations.

Greatest diameter, 32 ; lesser, 27 ; altitude, 19 millimetres.

Geographical distribution.—Found by Dr. J. S. Newberry north of San Francisco. Has not, as yet, been detected in other localities.

Remarks.—The typical specimen, from which Dr. Gould drew his description, has the general form and appearance of *H. Townsendiana*, Lea, from Oregon. That shell, however, is destitute of the minute granulations and black revolving band, and rufous blotches.

The variety found by Dr. Newberry might, at first sight, be considered another species. It is as globular and conical as the extreme form of *H. major* of the southern States. Upon careful examination, however, it is found to agree with *æruginosa* in all its characteristics.

No. 4. HELIX DUPETITHOUARSI, Deshayes.

Testa orbiculato-conoidea, lævigata nitens, subindentata, et lineis volventibus obscuris notata; colore castanea, fasciis duabus albis zonam nigram aut rufam includentibus induta; anfr. 7–8 convexiusculi; sutura impressa; umbilicus profundus, partem quintam diametris minoris æquans; apertura rotundata, intus castanea, trifasciata; labrum album, incrassatum, reflexiusculum, umbilicum aliquantum occultans.

SYNONYMS AND REFERENCES.

Helix Dupetithouarsi, Deshayes, Revue Zoologique, p. 360, anno Dec. 1839.
" Guerin. Mag. de Zool. 1841, pl. xxx.
" in Fer. Hist. I, p. 169, pl. xcvii, f. 8–10.
Chemnitz, ed. 2, p. 328, t. viii, f. 6, 7.
Pfeiffer, Monog. Hel. Viv. I, 338.—Ib. III, 229.
Reeve, Con. Icon. 659.
Helix oregonensis, Lea, Am. Phil. Soc. VI, p. 100, t. xxiii, f. 85, anno 1839.
Pfeiffer, Monog. Hel. Viv. I, 428.—Ib. III, 272.

DESCRIPTION.

Animal.—Not hitherto observed.

Shell.—Subglobose, depressed; spire more or less elevated, sometimes quite flat; whorls seven, rounded in some instances, crossed by minute revolving lines. Suture moderately impressed; aperture ovate; lip white and thickened, reflected at its connexion with the large and deep umbilicus, which it partially conceals. On the columella there is a slight deposition of callus. Epidermis smooth and shining, in some individuals marked lightly in parts by the peculiar indentations characteristic of the California helices. Color variable, generally of an uniform dark chestnut or light fawn, with a broad black band on the body whorl, enclosed above and below by white bands of equal breadth, which are concealed in the suture of the upper whorls.

Greatest diameter, 25; lesser, 20; altitude, 13 millimetres.

Geographical distribution.—Found by Dr. Newberry at San Francisco and Benicia, in California, and on the shores of Klamath lake, in Oregon Territory. It seems to be one of the commonest and most widely distributed species of the Pacific region.

Remarks.—This shell is readily distinguished from others of the same habitat by its very smooth and shining epidermis, unusually free from any granulations or indentations. The indentations, when present, cross the incremental wrinkles of the surface at regular intervals, giving the appearance of broad, revolving lines. It is a beautiful and very distinct species.

There can be no doubt but that the figure and description of *H. oregonensis*, Lea, were drawn from an immature specimen of this shell. Although they appeared in the same year as those of M. Deshayes, the latter have, of course, the priority, being made from the mature shell.

3

GEOLOGICAL SURVEY OF CALIFORNIA.

J. D. WHITNEY, STATE GEOLOGIST.

GEOGRAPHICAL

CATALOGUE OF THE MOLLUSCA

FOUND WEST OF THE ROCKY MOUNTAINS,

BETWEEN LATITUDES 33° AND 49° NORTH.

BY J. G. COOPER, M. D.

SAN FRANCISCO:
Towne & Bacon, Printers.
1867.

NOTICE.

THE following list is based on that published by P. P. CARPENTER, in his Report to the British Association for the Advancement of Science, 1863, with the addition of about 130 species which have been described since then, or were omitted. The land and fresh water species, at that time only partially determined and not embodied in the general list, are also added. The changes in range of distribution here made are founded on more recent and correct information than was at his command, including unpublished collections of Dr. Canfield, of Monterey; Dr. Newcomb, of Oakland; Rev. J. Rowell, Mr. J. Hepburn and R. E. C. Stearns, of San Francisco; Mr. Gabb, Prof. Brewer and Mr. Bolander, of the Geological Survey; Mr. W. H. Dall, of the W. U. Telegraph Expedition, and others, whose special discoveries and labors have been all acknowledged and tabulated in the Report on Mollusca to be published as one of the series of the Geological Survey.

There are twenty or thirty species still undetermined, and now in Mr. Carpenter's hands, which will appear in the final report.

It need scarcely be added that this list is not intended for a final authority on the subject of names, which will probably be considerably changed by the time the volume on Mollusca is printed.

Most of these living species are found fossil also in the tertiary formations along this coast, and have a wider range of distribution, many extending inland to the Sierra Nevada, but the localities could not be included here. Specimens are found nearly as perfect as the living shells.

The list is intended for use both as a reference or check-list, and for labels. Copies may be obtained at the office of the State Geological Survey, No. 90 Montgomery Block, San Francisco.

N. B.—POLYZOA and TUNICATA are not included.

SAN FRANCISCO, April, 1867.

GEOGRAPHICAL CATALOGUE.

1 **Lingula albida** *Hinds.*
Santa Barbara, 28 fms; San Diego—L. Cal.

2 **Rhynchonella psittacea** *Linn.*
Str. Fuca, north; circumpolar—Maine.

3 **Terebratula unguiculus** *Cpr.*
Str. Fuca to San Diego, near l. w. to 20 fms.

4 **Waldheimia pulvinata** *Gld.*
Puget's Sd. to Arctic Sea.

5 **Waldheimia Californica** *Koch.*
Catalina I. 80 fms.—Kamtschatka?

6 **Waldheimia Grayi** *Dav.*
New Year Point to Catalina I.—Japan.

7 **Terebratella Coreanica** *A. Ad.*
Str. Fuca—China; Japan.

8 **Terebratella caurina** *Gld.*
Puget Sound to Sitka—China?

9 **Navea Newcombii** *Tryon.*
New Y'r Pt. to S. Cruz—L. Cal.? (in *Haliotis.*)

10 **Xylotrya pennatifera** *Blainv.*
Str. Fuca to S. F. Bay—England.

11 **Xylotrya fimbriata** *Jeffrey.*
Str. Fuca—England.

12 **Xylotrya setacea** *Tryon.*
S. F. Bay (to San Pedro?)

13 **Zirphœa crispata** *Linn.*
Str. Fuca to San Diego—N. Atlantic.

14 **Pholadidea penita** *Conr.*
Str. Fuca to Santa Barbara, l. w.

15 **Pholadidea ovoidea** *Gld.*
Baulines Bay to San Diego; rare.

16 **Netastomella Darwinii** *Sby.*
Str. Fuca to San Diego—S. America.

17 **Martesia intercalata** *Cpr.*
Farallone Is. to Mazatlan—(in Haliotis.)

18 **Parapholas Californica** *Conr.*
Baulines Bay to San Diego.

19 **Saxicava pholadis** *Linn.*
Str. Fuca to Santa Barbara—Universal ?

20 **Glycimeris generosa** *Gld.*
Puget Sound to San Pedro—Kamtschatka.

21 **Mya truncata** *Linn.*
Str. Fuca, north—circumpolar—Mass.

22 **Platyodon cancellatum** *Conr.*
Baulines Bay to San Diego.

23 **Cryptomya Californica** *Conr.*
Str. Fuca to San Diego.

24 **Schizothærus Nuttalli** *Conr.*
Str. Fuca to San Diego—Sitka—Japan.

25 **Darina declivis** *Cpr.*
Str. Fuca—California ?

26 **Corbula luteola** *Cpr.*
San Pedro to San Diego; (color various.)

27 **Sphœnia ovoidea** *Cpr.*
Str. Fuca.

28 **Neæra pectinata** *Cpr.*
Str. Fuca to Catalina I. 20—120 fms.

29 **Clidiophora punctata** *Conr.*
Str. Fuca to S. Diego, l. w. to 30 fms.

30 **Kennerlia filosa** *Cpr.*
Str. Fuca. (Adult of *bicarinata?*)

31 **Kennerlia bicarinata** *Cpr.*
Catalina I. 40—60 fms. (Young ?)

32 **Periploma argentaria** *Conr.*
San Pedro to San Diego.

33 **Thracia curta** *Conr.*
Str. Fuca to San Diego.

34 **Cyathodonta undulata** *Conr.*
Sta. Barbara to S. Diego—Gulf of Cal.

35 **Lyonsia Californica** *Conr.*
Str. Fuca to Santa Barbara.

36 **Lyonsia nitida** *Gld.*
S. F. Bay to San Diego. (Young ?)

37 **Entodesma saxicola** *Baird.*
Str. Fuca to Farallone Is.

38 **Entodesma inflata** *Conr.*
San Pedro, south—Panama.

39 **Mytilimeria Nuttalli** *Conr.*
Str. Fuca to San Diego.

40 **Plectodon scaber** *Cpr.*
Catalina I. 40—60 fms., 2 valves only.

41 **Solen sicarius** *Gld.*
Str. Fuca to San Pedro—Japan.

42 **Solen rosaceus** *Cpr.*
Santa Barbara to San Diego.

43 **Solecurtus Californianus** *Conr.*
Santa Barbara to San Diego.

44 **Solecurtus subteres** *Conr.*
Santa Barbara to San Diego (=*Californianus* ?)

45 **Machæra patula** *Dixon.*
Str. Fuca to San Diego—Kamtschatka, Japan.

46 **Sanguinolaria Nuttalli** *Conr.*
Santa Barbara to San Diego—Japan.

47 **Psammobia rubroradiata** *Conr.*
Str. Fuca to San Diego—Sitka.

48 **Macoma secta** *Conr.*
Baulines Bay to San Diego—Japan ?

49 **Macoma edulis** *Nutt.*
Str. Fuca to Baul's Bay—Japan ? (=*secta var ?*)

50 **Macoma indentata** *Cpr*
Monterey ; (to San Diego ?)

51 **Macoma yoldiformis** *Cpr.*
Str. Fuca to San Pedro.

52 **Macoma nasuta** *Conr.*
Str. Fuca to San Diego—Kamtschatka.

53 **Macoma inquinata** *Desh.*
Str. Fuca to Monterey. Estuaries.

54 **Macoma edentula** *Br. & Sby.*
Str. Fuca ? Behring's Str. to Japan.

55 **Macoma expansa** *Cpr.*
Str. Fuca. (=lata *Desh.* var ?)

56 **Macoma inconspicua** *Br. & Sby.*
Str. Fuca to Santa Barbara—Aretic.

57 **Mera modesta** *Cpr.*
Str. Fuca.

58 **Mera obtusa** *Cpr.*
Str. Fuca to San Diego. (=modesta *var* ?)

59 **Mera variegata** *Cpr.*
Str. Fuca to Catalina I. Bch—120 fms.

60 **Mera Gouldii** *Hanl.*
San Diego—Cerros Is., Lower Cal.

61 **Mera salmonea** *Cpr.*
Str. Fuca to Monterey. Bch. to 20 fms.

62 **Tellina Bodegensis** *Hds.*
Str. Fuca to San Diego—Japan.

63 **Tellinella**
San Pedro—2 valves dredged. (No. 590.)

64 **Arcopagia lamellata** *Cpr.*
San Diego—Mazatlan.

65 **Œdalina subdiaphana** *Cpr.*
San Diego; (San Pedro?)

66 **Cooperella scintillæformis** *Cpr.*
Santa Barbara to San Diego.

67 **Lutricola alta** *Conr.*
Santa Barbara to San Diego.

68 **Semele decisa** *Conr.*
Santa Barbara to San Diego.

69 **Semele rupium** *Sby.*
Santa Cruz to Barbara Is.—Galapagos.

70 **Semele**
Str. Fuca to Monterey.

71 **Semele rubrolineata** *Conr.*
"S. Diego, Nuttall." (=decisa *var?*)

72 **Semele pulchra** *Sby.*
Monterey to S. Diego—Acapulco to S. America.

73 **Semele incongrua** *Cpr.*
Catalina I. 16—40 fms. rare.

74 **Semele flavescens** *Gld.*
San Diego?—Mazatlan.

75 **Cumingia Californica** *Conr.*
Monterey to San Diego—Mazatlan.

76 **Donax Californicus** *Conr.*
Monterey? San Luis Obispo to S. Diego.

77 **Donax flexuosus** *Gld.*
Santa Barbara? to San Pedro.

78 **Donax navicula** *Sby.*
S. Pedro? Cape St. Lucas? to S. America.

79 **Heterodonax bimaculatus** *D'Orb.*
Monterey? S. Pedro to S. Diego—Mex.—W. I.

80 **Gnathodon mendicum** *Gld.*
Colorado estuary to Mazatlan.

81 **Standella Californica** *Conr.*
Str. Fuca to San Pedro.

82 **Standella nasuta** *Gld.*
S. Pedro to S. Diego (=planulata *var?*)

83 **Standella planulata** *Conr.*
Santa Barbara to San Diego.

84 **Standella falcata** *Gld.*
Str. Fuca to Monterey.

85 **Raeta undulata** *Gld.*
S. Pedro, rare—La Paz, Gulf of California.

86 **Clementia subdiaphana** *Cpr.*
Str. Fuca—California?

87 **Amiantis callosa** *Conr.*
Santa Barbara to S. Diego—Cape St. Lucas.

88 **Pachydesma crassatelloides** *Conr.*
Santa Cruz to San Diego. (Str. Fuca?)

89 **Psephis tantilla** *Gld.*
Str. Fuca to Catalina I., l. w. to 25 fms.

90 **Psephis Lordi** *Baird.*
Str. Fuca to San Diego; (southern variety.)

91 **Psephis salmonea** *Cpr.*
Catalina I. 30—40 fms., rare.

92 **Psephis tellimyalis** *Cpr.*
Farallone Is. or Lower Cal.? on Haliotis.

93 **Mercenaria Kennerleyi** *Rve.*
Str. Fuca to Monterey—(Kamtschatka?)

94 **Meretrix toreuma** *Gld?*
Santa Barbara to Catalina I.—"E. Indies."

95 **Lioconcha Newcombiana** *Gabb.*
Monterey to Catalina I.—rare.

96 **Chione succincta** *Val.*
S. Barbara to S. Diego—Mexico—S. America.

97 **Chione excavata** *Cpr.*
San Pedro to San Diego—(=succincta *var?*)

98 **Chione simillima** *Sby.*
Monterey to San Diego.

99 **Chione fluctifraga** *Sby.*
San Pedro to San Diego—Gulf of Cal.

100 **Tapes tenerrima** *Cpr.*
Str. Fuca to San Diego—not "Panama."

101 **Tapes laciniata** *Cpr.*
Monterey to San Diego—(=staminea *var?*)

102 **Tapes staminea** *Conr.*
Str. Fuca to San Diego—Margarita Bay.

103 **Tapes staminea** *var.* **Petitii** *Desh.*
Str. Fuca to Monterey—Kamtschatka.

104 **Tapes staminea** *var.* **ruderata** *Desh.*
Str. Fuca to Santa Cruz.

105 **Tapes staminea** *var.* **diversa** *Sby.*
Baulines Bay to San Diego.

106 **Tapes staminea** *var.* **tumida** *Sby.*
In cavities of rocks.

107 **Tapes staminea** *var.* **orbella** (*Cpr.?*)
In cavities of rocks.

108 **Saxidomus gracilis** *Gld.*
Baulines Bay to San Diego—(=aratus *Gld.?*)

109 **Saxidomus Nuttalli** *Conr.*
S. F. Bay to San Diego—Sitka? Japan?

110 **Saxidomus squalidus** *Desh.*
Str. Fuca to S. F. Bay—(=Nuttalli *var?*)

111 **Saxidomus brevisiphonatus** *Cpr.*
Str. Fuca—Vancouver's I.

112 **Rupellaria lamellifera** *Conr.*
Farallone Is. to San Diego.

113 **Petricola carditoides** *Conr.*
Str. Fuca to San Diego—Sitka.

114 **Chama exogyra** *Conr.*
Baulines Bay to San Diego—Mexico.

115 **Chama pellucida** *Sby.*
Farallone Is. to San Diego—S. America.

116 **Chama spinosa** *Sby.*
Catalina I. to S. Diego—Mexico, Galapagos.

117 **Cardium corbis** *Martyn.*
Str. Fuca to S. Barbara—Sitka, Kamtschatka.

118 **Cardium quadragenarium** *Conr.*
Monterey to San Diego.

119 **Cardium blandum** *Gld.*
Str. Fuca to Monterey—Sitka; Asia?

120 **Cardium centifilosum** *Cpr.*
Monterey to Catalina I. 20—40 fms.

121 **Hemicardium biangulatum** *Sby.*
Catalina I.—Mexico, Panama.

122 **Serripes Grœnlandicus** *Chem.*
Str. Fuca—Sitka—circumpolar—Mass.

123 **Liocardium elatum** *Sby.*
S. Pedro to S. Diego—Gulf, Mazatlan.

124 **Liocardium substriatum** *Conr.*
Monterey to San Diego—S. America?

125 **Astarte compacta** *Cpr.*
Str. Fuca—(Like *compressa* of Atlantic.)

126 **Astarte Esquimalti** *Baird.*
Str. Fuca—Vancouver's I.

127 **Astarte fluctuata** *Cpr.*
Catalina I.; (2 valves dredged, 40—60 fms.)

128 **Crassatella**
San Diego, 1 dredged; (No. 676.)

129 **Miodon prolongatus** *Cpr.*
Str. Fuca to Monterey; (dredged.)

130 **Venericardia borealis** *Conr.*
Vanc. I.—Catalina I. 120 fms.—N. Atlantic.

131 **Venericardia borealis** *var.* **ventricosa**
Str. Fuca to Cat. I. 120 f.—S. Barbara. [*Gld.*

132 **Lazaria subquadrata** *Cpr.*
Str. Fuca to San Diego.

133 **Trapezium**
Monterey; l. w. alive in *Haliotis*—San Diego?

134 **Lucina Nuttalli** *Conr.*
Monterey to San Diego.

135 **Lucina Californica** *Conr.*
Santa Cruz to San Diego.

136 **Lucina bella** *Conr.*
S. Diego, (fossil?)—Mazatlan.

137 **Lucina tenuisculpta** *Cpr.*
Str. Fuca to Catalina I.—Mazatlan?

138 **Lucina borealis** *Linn.*
Catal. I. 40—120 fms.—N. Atlantic—Asia?

139 **Lucina**
Monterey.

140 **Cryptodon flexuosus** *Mont.*
Catal. I. 120 fms.—England—Asia?

141 **Cryptodon serricatus** *Cpr.*
Str. Fuca—Catal. I. 120 fms. (Distinct sp.?)

142 **Diplodonta orbella** *Gld.*
Str. Fuca to S. Diego—in holes of rocks.

143 **Kellia Laperousii** *Desh.*
Str. Fuca to Santa Barbara—in holes.

144 **Kellia Laperousii** *var.* **Chironii** *Cpr.*
Str. Fuca to San Diego.

145 **Kellia rotundata** *Cpr.*
Monterey; (=Laperousii *var?*)

146 **Kellia suborbicularis** *Mont.*
Str Fuca to S. Diego—Mex.—Pan.—Europe.

147 **Lasea rubra** *Mont.*
Str. Fuca to S. Pedro—All N. hemisphere.

148 **Pythina rugifera** *Cpr.*
Str. Fuca.

149 **Lepton mercœum** *Cpr.*
Monterey? S. Diego—shell washings, minute.

150 **Tellimya tumida** *Cpr.*
Str. Fuca to San Diego.

151 **Pristiphora oblonga** *Cpr.*
San Diego—minute.

152 **Sphærium striatinum** *Lam.*
Hell Gate R., Montana? Missouri R. and east.

153 **Sphærium dentatum** *Hald.*
"Oregon;" Nuttall coll., 1834.

154 **Sphærium occidentale** *Prime.*
Hell Gate R., Montana—Eastern States.

155 **Sphærium nobile** *Gould.*
Near San Pedro, Cal., or Colorado River.

156 **Sphærium patella** *Gld.*
"Oregon;" U. S. Expl. Expd'n coll., 1847.

157 **Sphærium lenticula** *Gld.*
Lake Taho and Carson River; Klamath River.

158 **Sphærium tumidum** *Baird.*
Sumass R., lat. 49, W. T.

159 **Sphærium Spokani** *Baird.*
Spokan R. to Kootenai R. lat. 49, W. T.

160 **Pisidium compressum** *Prime.*
"California"—North Atlantic States.

161 **Pisidium abditum** *Hald.*
"California"—Atlantic States.

162 **Pisidium occidentale** *Newc.*
Merced Lake, S. F., to Santa Cruz, Cal.

163 **Pisidium ultramontanum** *Prime.*
Canoe Creek, Pit River, California.

164 **Unio Oregonensis** *Lea.*
"Columbia River," Wheatley Museum.

165 **Margaritana falcata** *Gld.*
S. Cruz, California, north—Nevada; Montana.

166 **Anodonta angulata** *Lea.*
San Joaquin R., north; Idaho; Montana.

167 **Anodonta Californiensis** *Lea.*
Inland streams of Cal.—Colorado River.

168 **Anodonta Nuttalliana** *Lea.*
Willamette River; Idaho—Vancouver's I.?

169 **Anodonta Oregonensis** *Lea.*
Near San Francisco; Oregon; Montana.

170 **Anodonta Wahlamatensis** *Lea.*
Upper Sacramento R.; Idaho to British Col

171 **Anodonta Kennerleyi** *Lea.*
Lake Chiloweyuck, lat. 49, W. T.

172 **Mytilus Californianus** *Conr.*
Str. Fuca to San Diego—Q. Charlotte's I.

173 **Mytilus edulis** *Linn.*
Monterey, north—Japan; N. Atlantic.

174 **Mytilus edulis** *var.* **glomeratus** *Gld.*
S. F. Bay, on algæ—deformed?

175 **Septifer bifurcatus** *Rve.* [Conr.)
Farallone Is. to San Diego. (Not *Myt. bifurc.*

176 **Modiola capax** *Conr.*
S. Barbara to S. Diego—Lower Cal. and Mex.

177 **Modiola modiolus** *Linn.*
Monterey, north—Asia; N. Atlantic.

178 **Modiola fornicata** *Cpr.*
Monterey to San Pedro.

179 **Modiola recta** *Conr.*
Santa Cruz to San Diego.

180 **Modiola recta** *var.* **fiabellata** *Gld.*
Str. of Fuca.

181 **Adula falcata** *Gld.*
San Francisco to San Diego—New Zealand?

182 **Adula stylina** *Cpr.*
Str. Fuca to Monterey.

183 **Lithophagus plumula** *Hanl.*
Monterey to S. Diego—Mexico to Panama.

184 **Lithophagus attenuatus** *Desh.*
Monterey, south?—Lower Cal. to S. America.

185 **Modiolaria lævigata** *Gray.*
Str. Fuca—Japan; N. Atlantic.

186 **Modiolaria marmorata** *Fbs.*
Str. Fuca—Europe.

187 **Crenella decussata** *Mont.*
Catalina I. 10—40 fms.—North Europe.

188 **Barbatia gradata** *Sby.*
S. Barbara to S. Diego—Japan; Mex. and S. A.

189 **Axinæa intermedia** *Brod.?*
Monterey to San Diego—South America.

190 **Axinæa septentrionalis** *Midd.*
Sitka to Aliaska; "Ukamok I." lat. 64.

191 **Axinæa subobsoleta** *Cpr.*
Str. Fuca to Farallone Is. (=septent. *var*?)

192 **Nucula tenuis** *Mont.*
Str. Fuca to S. Barbara—Japan; N. Atlantic.

193 **Acila castrensis** *Hinds.*
Str. Fuca to San Diego—Sitka.

194 **Leda cælata** *Hinds.*
Bodega Bay to San Diego; 6—20 fms.

195 **Leda cuneata** *Sby.?*
Monterey to San Diego—Peru.

196 **Leda minuta** *O. Fabr.*
Str. Fuca—N. Atlantic.

197 **Leda fossa** *Baird.*
Str. Fuca—Vanc. I. 10—15 fms.

198 **Leda hamata** *Cpr.*
Santa Barbara 16—28 fms. Catalina I?

199 **Yoldia lanceolata** *J. Sby.*
Str. Fuca—Japan; N. Atlantic?

200 **Yoldia amygdala**
Str. Fuca—Monterey 40 fms.

201 **Yoldia Cooperi** *Gabb.*
Santa Cruz to San Pedro—Beach, valves.

202 **Verticordia ornata** *D'Orb.*
Santa Barbara, 28 fms.—Japan; Peru.

203 **Philobrya setosa** *Cpr.*
Santa Barbara—Cape St. Lucas; Acapulco.

204 **Lima dehiscens** *Conr.*
Monterey to S.Diego—(=orientalis *Ad*? China.)

205 **Limatula subauriculata** *Mont.*
Catalina I. to San Diego—N. Atlantic.

206 **Pecten hastatus** *Sby.*
Str. Fuca to Santa Barbara—Sitka; Aliaska.

207 **Pecten hastatus** *var.* **Hindsii** *Cpr.*
Str. Fuca to Santa Cruz—Sitka.

208 **Pecten paucicostatus** *Cpr.*
Santa Barbara (to San Pedro?) *var?*

209 **Pecten æquisulcatus** *Cpr.*
Monterey to San Diego (=ventricosus *var*?)

210 **Pecten latiauritus** *Conr.*
Monterey to San Diego.

211 **Pecten monotimeris** *Conr.*
Monterey to San Diego; (=latiauritus *var*?)

212 **Amusium caurinum** *Gld.*
Str. Fuca (to Santa Barbara?)—Japan.

213 **Janira dentata** *Sby.*
Monterey to San Diego—Gulf California.

214 **Hinnites giganteus** *Gray.*
Str. Fuca to San Diego.

215 **Ostrea lurida** *Cpr.*
Str. Fuca to San Diego.

216 **Ostrea (lurida** *var?*) **laticaudata** *Cpr.*
San Francisco Bay to San Diego.

217 **Ostrea conchaphila** *Cpr.*
Catalina I. to Panama.

218 **Ostrea (conchaph.** *var?*) **expansa** *Cpr.*
San Diego—Margarita Bay.

219 **Ostrea (conchaph.** *var?*) **rufoides** *Cpr.*
San Diego.

220 **Placunanomia macroschisma** *Desh.*
Str. Fuca to San Diego—Japan.

221 **Anomia lampe** *Gray.*
"Monterey, 60 fms." San Pedro to Mexico.

222 **Cavolina telemus** *Linn.*
Str. Fuca to Catalina I. Pelagic.

223 **Limacina arctica** *Fabr.*
Monterey?—N. Pacific; N. Atlantic.

224 **Bulla nebulosa** *Gld.*
Santa Barbara to S. Diego—Lower Cal.—Gulf.

225 **Bulla Quoyi** *Gray.*
S. Barbara to S. Diego?—Mex. "N. Zealand."

226 **Bulla Adamsii** *Mke.*
San Pedro? to Panama.

227 **Haminea hydatis** *Linn.*
Str. Fuca—Europe.

228 **Haminea vesicula** *Gld.*
Santa Barbara to San Diego—Cape St, Lucas.

229 **Haminea virescens** *Sby.*
Catalina I. to San Diego.

230 **Atys nonscripta** *A. Ad.*
San Diego; (original locality unknown.)

231 **Tornatella punctocælata** *Cpr.*
Santa Cruz to San Diego.

232 **Tornatina culcitella** *Gld.*
Monterey to San Diego.

233 **Tornatina cerealis** *Gld.*
Monterey to San Diego.

234 **Tornatina eximia** *Baird.*
Monterey?—Vanc. I. 12 fms.

235 **Tornatina carinata** *Cpr.*
Santa Barbara to San Diego; Panama.

236 **Cylichna cylindracea** *Linn.*
Monterey to San Diego—Europe.

237 **Cylichna (cyl.** *var?*) **attonsa** *Cpr.*
Str. Fuca to Santa Barbara.

238 **Cylichna planata** *Cpr.*
San Diego. (Cassidy.)

239 **Cylichna inculta** *Gld.*
San Diego. (Blake?)

240 **Volvula cylindrica** *Cpr.*
Santa Barbara. (Jewett.)

241 **Neaplysia Californica** *Cp.*
Monterey to San Pedro.

242 **Navarchus inermis** *Cp.*
Catalina I. to San Diego.

243 **Pleurophyllidea Californica** *Cp.*
San Diego—Vancouver's I.?

244 **Doris sanguinea** *Cp.*
Barbara I. to S. Diego.

245 **Doris alabastrina** *Cp.*
San Diego; 1 specimen, l. w.

246 **Doris albopunctata** *Cp.*
Baulines Bay to Catalina I.

247 **Doris Sandiegensis** *Cp.*
Baulines Bay to San Diego.

248 **Doris Montereyensis** *Cp.*
San Francisco Bay to Barbara I.

249 **Triopa Catalinæ** *Cp.*
Baulines Bay to Catalina I.

250 **Tritonia Palmeri** *Cp.*
San Diego, l. w., sand, in December.

251 **Dendronotus iris** *Cp.*
Santa Barbara channel; in kelp.

252 **Æolis Barbarensis** *Cp.*
Santa Barbara beach, on algæ.

253 **Phidiana iodinea** *Cp.*
Santa Cruz to San Diego.

254 **Flabellina opalescens** *Cp.*
Monterey to San Diego.

255 **Chiorœra leonina** *Gld.*
Str. Fuca—Santa Barbara?

256 **Ariolimax Columbianus** *Gld.*
Str. Fuca to Santa Barbara.

257 **Arion foliolatus** *Gld.*
Puget's Sound country—California?

258 **Succinea Stretchiana** *Bland.*
Near Lake Taho, Sierra Nevada.

259 **Succinea Gabbii** *Tryon.*
Northeast California and Southeast Oregon.

260 **Succinea Hawkinsii** *Baird.*
Near lat. 49, Wash. Territory.

261 **Succinea rusticana** *Gld.*
Oregon to Tulare Valley, Cal.

262 **Succinea Nuttalliana** *Lea.*
Wright's Lake, Cal. to Snake R. Oregon.

263 **Succinea lineata** *W. G. Binn.*
Northeast Cal. to Nebraska and Brit. Col.

264 **Succinea Oregonensis** *Lea.*
Oregon to Santa Cruz, Cal.

265 **Succinea Sillimani** *Bland.*
Humboldt Lake, Nevada.

266 **Vitrina Pfeifferi** *Newc.*
Carson Valley, Nev., to Owen's Valley, Cal.

267 **Binneya notabilis** *Cp.*
Barbara I. Cal.; southeast side only.

268 **Hyalina arborea** *Say.*
San Gorg. Pass, Cal.—Montana—E. States.

269 **Hyalina Breweri** *Newc.*
"Big Trees," Calaveras Co., north.

270 **Macrocyclis Newberryana** *W. G. Binn.*
Temescal Mountains, near San Diego.

271 **Macrocyclis Vancouverensis** *Lea.*
Santa Cruz, Cal. north; Idaho.

272 **Macrocyclis sportella** *Gld.*
Shasta Co., Cal., to Puget's Sound.

273 **Macrocyclis Voyana** *Newc.*
Cañon Creek, Trinity Co., Cal.

274 **Conulus chersina** *Say.*
San Gorgonio Pass to Lake Taho—E. States.

275 **Conulus? chersinella** *Dall.*
"Big Trees," Calaveras Co., Cal.

276 **Pseudohyalina milium** *Morse?*
Monterey to Nevada Co., Cal.—Maine.

277 **Pseudohyalina minuscula** *Binn.*
San Bernardino, eastward to Maine—W. I.

278 **Pseudohyalina conspecta** *Bland.*
San Francisco; Monterey.

279 **Patula Hornii** *Gabb.*
Fort Grant, Arizona.

280 **Patula Whitneyi** *Newc.*
Near Lake Taho, California.

281 **Patula Cronkhitei** *Newc.*
Alameda Co., Cal., to Klamath Lake.

282 **Patula striatella** *Anth.*
Montana?—Northern States to Slave Lake.

283 **Patula Durantii** *Newc.*
Barbara I., Cal.; southeast side only.

284 **Helicodiscus? polygyrella** *Bld.*
Bitter-root Mountains, Montana; in moss.

285 **Anguispira solitaria** *Say.*
Montana? Missouri to Lake Erie.

286 **Anguispira Cooperi** *W. G. Binn.*
Montana to Arizona; in mountains.

287 **Anguispira strigosa** *Gld.*
Montana to Arizona; in mountains.

288 **Anguispira? Idahoensis** *Newc.*
Eastern Idaho; in mountains.

289 **Helix Hillebrandi** *Newc.*
Mariposa and Tuolumne Cos., Cal.

290 **Helix Mormonum** *Pfeiff.*
Fresno Co. to Shasta Co., Cal.

291 **Helix sequoicola** *Cp.*
Santa Cruz Co., Cal.

292 **Helix infumata** *Gld.*
Contra Costa Co. to Mendocino Co., Cal.

293 **Helix fidelis** *Gray.*
Humboldt Bay, Cal., to Vancouver's I.

294 **Helix Dupetithouarsi** *Desh.*
Monterey, Cal. (Point Cypress.)

295 **Helix Ayresiana** *Newc.*
Santa Cruz I., Cal. (Newcomb Coll.)

296 **Helix Traskii** *Newc.*
Near Los Angeles to San Luis Obispo, Cal.

297 **Helix rufocincta** *Newc.*
Catalina I., Cal.; San Diego?

298 **Helix Gabbii** *Newc.*
Clemente I., Cal.; Catalina I?

299 **Helix facta** *Newc.*
Barbara and Nicolas Is., Cal.

300 **Helix Rowellii** *Newc.*
"Arizona?" (Frick.)

301 **Helix Carpenteri** *Newc.*
Tulare Valley. Very rare.

302 **Helix Tryoni** *Newc.*
Barbara and Nicolas Is., Cal.

303 **Helix intercisa** *W. G. Binn.*
"Oregon"—San Miguel I., Cal.?

304 **Helix crebristriata** *Newc.*
Clemente I.; San Miguel I., Cal.?

305 **Helix Kellettii** *Frbs.*
Catalina I., San Diego and south.

306 **Helix Californiensis** *Lea.*
Monterey, Cal. Rare.

307 **Helix redimita** *W. G. Binn.*
San Francisco to Monterey.

308 **Helix Nickliniana** *Lea.*
Santa Cruz to Mendocino Co., Cal.

309 **Helix Bridgesii** *Newc.*
Contra Costa Co., Cal. (=Nickl. *var.?*)

310 **Helix arrosa** *Gld.*
Santa Cruz to Mendocino Co., Cal.

311 **Helix exarata** *Pfeiff.*
Santa Cruz Co., Cal.; Marin Co.?

312 **Helix ramentosa** *Gld.*
Napa Co. to Santa Clara Co., Cal.

313 **Helix reticulata** *Pfeiff.*
Locality unknown; (=ramentosa *var?*)

314 **Helix tudiculata** *Binn.*
Placer Co. to S. Diego, Cal.; Oregon?

315 **Helix Townsendiana** *Lea.*
Crescent City, Cal., north; Montana.

316 **Helix anachoreta** *W. G. Binn.*
California? Oregon. (Rowell Mus.)

317 **Odotropis devia** *Gld.*
Oregon to Vancouver's I.

318 **Aplodon Columbiana** *Lea.*
Wash. Territory to Santa Cruz, Cal.; Sitka?

319 **Aplodon germana** *Gld.*
"Oregon." Probably =Columb. *var.*

320 **Triodopsis Mullani** *Bld.*
Western Mountains of Montana.

321 **Triodopsis loricata** *Gld.*
Near San Francisco to Klamath Co., Cal.

322 **Pupa hordacea** *Gabb.*
Fort Grant, Arizona.

323 **Pupa Arizonensis** *Gabb.*
Fort Grant, Arizona.

324 **Isthmia corpulenta** *Morse.*
Lake Taho to Washoe Co., Nev.

325 **Pupilla Californica** *Rowell*
Near San Francisco to Monterey.

326 **Pupilla Rowellii** *Newc.*
Near Oakland, Alameda Co.

327 **Pedipes unisulcata** *Cp.*
San Pedro, Cal.; on beach.

328 **Pedipes lirata** *W. G. Binn.*
Cape St. Lucas, Lower Cal.—San Diego ?

329 **Melampus olivaceus** *Cpr.*
Salinas River, Cal., to Mazatlan.

330 **Limnæa stagnalis** *Linn.*
Ruby Valley, Utah, north—circumboreal.

331 **Limnæa lepida** *Gld.*
"Lake Vancouver," Wash. Ter.; Oregon.

332 **Limnophysa Rowellii** *Tryon.*
Near San Francisco.

333 **Limnophysa palustris** *Mull.*
Near San Francisco—circumboreal.

334 **Limnophysa proxima** *Lea.*
Alameda County, Cal., to Oregon.

335 **Limnophysa Gabbii** *Tryon.*
Clear Lake, California.

336 **Limnophysa Adelinæ** *Tryon.*
Near San Francisco, California.

337 **Limnophysa Traskii** *Tryon.*
Mountain Lake, San Francisco Co., Cal.

338 **Limnophysa umbrosa** *Say.*
Near San Francisco, Cal.; Eastern States.

339 **Limnophysa bulimoides** *Lea.*
San Francisco, north and east; S. Diego ?

340 **Limnophysa solida** *Lea.*
Willamette River, Oregon.

341 **Limnophysa ferruginea** *Hald.*
"Oregon." (=humilis *Say.*?)

342 **Limnophysa humilis** *Say.*
Alameda County, Cal.; Eastern States.

343 **Limnophysa Sumassi** *Baird.*
Oregon to British Columbia.

344 **Limnophysa Binneyi** *Tryon.*
"Hell Gate River," Montana.

345 **Limnophysa Nuttalliana** *Lea.*
San Francisco to Oregon.

346 **Limnophysa Tryonii** *Lea.*
Alameda County, California.

347 **Limnophysa obrussa** *Say.*
"Oakland," Cal.; Eastern States.

348 **Limnophysa caperata** *Say.*
"S. F. to Oregon." Eastern States.

349 **Acella**
Spring on Spokan Plain, W. T.

350 **Physa Grosvenorii** *Lea.*
Dayton, Nevada. (Wheatley Mus.)—Kansas.

351 **Physa coniformis** *Tryon.*
Humboldt River, Nevada.

352 **Physa Cooperii** *Tryon.*
Crane Lake Valley, northeast Cal.

353 **Physa sparsestriata** *Tryon.*
San Joaquin Valley, Cal.

354 **Physa diaphana** *Tryon.*
Oakland, Alameda Co., Cal.

355 **Physa malleata** *Tryon.*
Goose Lake Valley, N. E. Cal.—Montana.

356 **Physa Nuttallii** *Lea.*
Lewis River, Idaho.

357 **Physa distinguenda** *Tryon.*
Marysville to Stockton, Cal.

358 **Physa politissima** *Tryon.*
Sacramento, California.

359 **Physa parva** *Lea.*
Little Valley, Nev. (Wheatley Mus.)

360 **Physa propinqua** *Tryon.*
Jordan Creek, southwest Idaho.

361 **Physa gyrina** *Say.*
Carson River, Nev.; Utah. Eastern States.

362 **Physa ampullacea** *Gld.*
Lake Osoyoos, lat. 49, Wash. Ter.

363 **Physa occidentalis** *Tryon.*
Most of Cal. northward; Idaho.

364 **Physa Gabbii** *Tryon.*
Mountain Lake, S. F. Co., to Los Angeles.

365 **Physa costata** *Newc.*
Clear Lake, California.

366 **Physa virginea** *Gld.*
Sacramento River, Cal.; San Francisco ?

367 **Physa venusta** *Lea.*
Near Vancouver, Columbia R., W. T.

368 **Physa humerosa** *Gld.*
Colorado R., Cal.; Pecos R., Texas.

369 **Physa virgata** *Gld.*
S. Pedro to S. Diego; Mojave R. to Gila R.

370 **Physa triticea** *Lea.*
Shasta Co., Cal.; South and East Oregon.

371 **Physa concolor** *Hald.*
"Oregon"—probably young of another.

372 **Physa Traskii** *Lea.*
Los Angeles River, Cal.

373 **Physa Blandii** *Lea.*
Marysville, California.

374 **Aplexus hypnorum** *Linn.*
Montana? Russian Am.—circumboreal.

375 **Aplexus hordaceus** *Lea.*
Near Puget's Sound, W. T.; Vancouver's I.

376 **Planorbis subcrenatus** *Cpr.*
Oregon; Wash. Ter.? Vancouver's I.

377 **Planorbis gracilentus** *Gld.*
Colorado Desert, California.

378 **Planorbis tumens** *Cpr.*
San Francisco to Petaluma; Mazatlan.

379 **Planorbis glabratus** *Say.*
New Mexico? (=sinuosus *Bourg.*?)

380 **Planorbis Oregonensis** *Tryon.*
Nevada; Oregon; Idaho. (Hot spring.)

381 **Gyraulus vermicularis** *Gld.*
Walla Walla, W. T.; Oregon.

382 **Gyraulus parvus** *Say.*
Ruby Valley, Utah; Montana; Eastern States.

383 **Helisoma ammon** *Gld.*
Colorado R.; Kern Lake to Klamath Lake.

384 **Helisoma corpulentus** *Say.*
Columbia River, east to Lake Winipeg.

385 **Helisoma trivolvis** *Say.*
Whole United States; Cuba.

386 **Menetus opercularis** *Gld.*
Santa Cruz, Cal., to Str. Fuca, W. T.

387 **Carinifex Newberryi** *Lea.*
Clear Lake, Cal., to Klamath Lake, Or.

388 **Pompholyx effusa** *Lea.*
Carson River, Nev., to Pit River, Cal.

389 **Ancylus Kootaniensis** *Baird.*
Spokan to Kootanie River, W. T.

390 **Ancylus altus** *Tryon.*
Klamath River, California.

391 **Ancylus Newberryi** *Lea.*
Klamath Lake, Oregon.

392 **Ancylus crassus** *Hald.*
"Oregon." (Nuttall coll., 1834.)

393 **Ancylus caurinus** *W. Cp.*
Black River, Puget's Sound, W. T.

394 **Ancylus patelloides** *Lea.*
San Francisco to Santa Cruz, Cal.

395 **Ancylus fragilis** *Tryon.*
Laguna Honda, near San Francisco.

396 **Ancylus subrotundatus** *Tryon.*
Umpqua River, Oregon.

397 **Ancylus Nuttallii** *Hald.*
"Oregon." (Nuttall coll. 1834.)

398 **Gundlachia Californica** *Rowl.*
Feather River, Cal., near mouth.

399 **Siphonaria thersites** *Cpr.*
Neeah Bay; Str. Fuca, W. T.

400 **Ianthina globosa** *Sw.?*
S. Diego to Cape St. Lucas—Atlantic.

401 **Dentalium pretiosum** *Nutt.*
"California," (Nuttall.) Mexico?

402 **Dentalium Indianorum** *Cpr.*
Str. Fuca to Santa Barbara.

403 **Dentalium rectius** *Cpr.*
Str. Fuca.

404 **Dentalium semipolitum** *Br. and Sby.*
San Diego to Gulf of California.

405 **Dentalium hexagonum** *Sby.*
Santa Barbara to Mexico—"E. Indies, China."

406 **Crypochiton Stelleri** *Midd.*
Str. Fuca to Monterey—Kamtschatka.

407 **Katherina tunicata** *Wood.*
Str. Fuca to Monterey—Sitka.

408 **Tonicia lineata** *Wood.*
Str. Fuca to Monterey—Sitka; Kamtschatka.

409 **Tonicia submarmorea** *Midd.*
Str. Fuca to Oregon—Kamtschatka.

410 **Mopalia muscosa** *Gld.*
Str. Fuca to San Diego.

411 **Mopalia Wossnessenskii** *Midd.*
Str. Fuca to Santa Cruz—Sitka.

412 **Mopalia Kennerleyi** *Cpr.*
Str. Fuca, W. T.

413 **Mopalia Kennerleyi** *var?* **Swannii** *Cpr.*
Neeah Bay, W. T.

414 **Mopalia Hindsii** *Gray.*
Str. Fuca to Monterey.

415 **Mopalia Simpsonii** *Gray.*
San Francisco, California.

416 **Mopalia vespertina** *Gld.*
Str. Fuca to Monterey, Cal.

417 **Mopalia lignosa** *Gld.*
Str. Fuca to Monterey—Sitka.

418 **Mopalia acuta** *Cpr.*
"Monterey," (Nuttall coll.)

419 **Mopalia? sinuata** *Cpr.*
Str. Fuca, W. T.

420 **Mopalia? imporcata** *Cpr.*
Str. Fuca, W. T.

421 **Acanthopleura scabra** *Rve.*
Str. Fuca to Santa Barbara.

422 **Acanthopleura fluxa** *Cpr.*
Catalina I., or Santa Barbara I., Cal.

423 **Ischnochiton Magdalensis** *Hds.*
Monterey to San Diego—Lower Cal.

424 **Ischnochiton veredentiens** *Cpr.*
Monterey, or islands off South California.

425 **Lepidopleurus regularis** *Cpr.*
Monterey or southward.

426 **Lepidopleurus scabricostatus** *Cpr.*
Catalina I., 20 fms., rare.

427 **Lepidopleurus pectinatus** *Cpr.*
Catalina I., l. w., rare.

428 **Lepidopleurus Mertensii** *Midd.*
Str. Fuca to Monterey.

429 **Trachydermon retiporosus** *Cpr.*
Str. Fuca, W. T.

30 **Trachydermon interstinctus** *Gld.*
Puget's Sound to Monterey.

431 **Trachydermon trifidus** *Cpr.*
Str. Fuca, W. T.

432 **Trachydermon dentiens** *Gld.*
Puget's Sound, W. T.?

433 **Trachydermon pseudodentiens** *Cpr.*
Str. Fuca, W. T.

434 **Trachydermon gothicus** *Cpr.*
Catalina I., 20 fms., l. w.?

435 **Trachydermon Hartwegii** *Cpr.*
San Francisco to Monterey.

436 **Trachydermon Nuttallii** *Cpr.*
Str. Fuca to Monterey.

437 **Trachydermon flectens** *Cpr.*
Str. Fuca to San Diego.

438 **Callochiton fimbriatus** *Cpr., (Mss.)*
Catalina (or other ?) I., Cal.

439 **Leptochiton nexus** *Cpr.*
Catalina I., Cal.

440 **Acanthochites avicula** *Cpr.*
Monterey ? Catalina I. 8—20 fms.

441 **Nacella instabilis** *Gld.*
Str. Fuca to Monterey.

442 **Nacella insessa** *Hds.*
Baulines Bay to San Diego.

443 **Nacella subspiralis** *Cpr.*
Catalina I. 6—10 fms.

444 **Nacella depicta** *Hds.*
Santa Barbara to San Diego.

445 **Nacella paleacea** *Gld.*
Monterey to Santa Barbara.

446 **Nacella triangularis** *Cpr.*
Baulines Bay to Monterey.

447 **Tylodina fungina** *Gabb.*
Barbara I., Cal.

448 **Acmæa patina** *Esch.*
Str. Fuca to San Diego—Mazatlan—Sitka.

449 **Acmæa pelta** *Esch.*
Str. Fuca to San Diego—Sitka.

450 **Acmæa pelta** *var.* **Asmi** *Midd.*
Baulines Bay to Monterey—Sitka ?

451 **Acmæa persona** *Esch.*
Str. Fuca to San Diego—Mazatlan—Sitka.

452 **Acmæa scabra** *Nutt.*
Baulines Bay to San Diego—Mazatlan.

453 **Acmæa spectrum** *Nutt.*
Cape Mendocino to San Diego.

454 **Acmæa pileolus** *Midd.*
Sitka.

455 **Acmæa pileolus** *var. ?* **rosacea** *Cpr.*
Monterey to Santa Barbara.

456 **Lottia gigantea** *Gray.* (*Sby. ?*)
Farallone Is. to San Diego—S. A. ?

457 **Scurria mitra** *Esch.*
Str. Fuca to San Diego—Sitka.

458 **Scurria mitra** *var?* **funiculata** *Cpr.*
Monterey; deep water.

459 **Lepeta cœcoides** *Cpr.*
Str. Fuca to Farallone Is.

460 **Rowellia radiata** *Cp.*
Farallone Is. to Catalina I.

461 **Fissurella volcano** *Rve.*
Santa Cruz to San Diego.

462 **Fissurella violacea** *Esch.*
Crescent City, Cal., to Sitka? S. Amer.

463 **Glyphis aspera** *Esch.*
Str. Fuca to Santa Barbara—Sitka.

464 **Glyphis densiclathrata** *Rve.*
Baulines Bay to San Diego.

465 **Lucapina crenulata** *Sby.*
Monterey to San Diego.

466 **Puncturella cucullata** *Gld.*
Str. Fuca to Monterey.

467 **Puncturella galeata** *Gld.*
Str. Fuca, W. T.

468 **Puncturella Cooperi** *Cpr.*
Catalina I. 40 to 120 fms.

469 **Clypidella callomarginata** *Cpr.*
Lobitos to San Diego.

470 **Clypidella bimaculata** *Dall, (Mss)*
Farallone Is. to Barbara I.

471 **Emarginula bella** *Gabb.*
Santa Cruz to Monterey.

472 **Haliotis Cracherodii** *Leach*
Farallone Is. to San Diego—Lower Cal.

473 **Haliotis splendens** *Rve.*
Catalina I. to San Diego—Lower Cal.

474 **Haliotis corrugata** *Gray.*
Santa Barbara to San Diego.

475 **Haliotis rufescens** *Sw.*
Farallone Is. to San Nicolas I.—Galapagos?

476 **Haliotis Kamtschatkana** *Jonas.*
Str. Fuca to Monterey—Japan.

477 **Phasianella compta** *Gld.*
San Pedro to Mazatlan.

478 **Phasianella compta** *var?* **pulloides**
Santa Cruz to San Diego. [*Cpr.*

479 **Pomaulax undosus** *Wood.*
Santa Barbara to Cape St. Lucas—Monterey?

480 **Pachypoma gibberosum** *Chem.*
Str. Fuca to Catalina I.—New Zealand?

481 **Leptothyra sanguinea** *Cpr.*
Str. Fuca to San Diego—Japan—Europe?

482 **Leptothyra bacula** *Cpr.*
Santa Barbara to Catalina I.

483 **Leptothyra paucicostata** *Dall, (Mss.)*
Monterey.

484 **Liotia fenestrata** *Cpr.*
Monterey to Catalina I.

485 **Liotia acuticostata** *Cpr.*
Monterey to Catalina I.

486 **Ethalia supravallata** *Cpr.*
San Diego—shell washings.

487 **Ethalia invallata** *Cpr.*
San Diego—shell washings—*var?*

488 **Livona picoides** *Gld.*
Pt. Conception or San Buenaventura? Cal.

489 **Trochiscus Norrisii** *Sby.*
Santa Barbara to San Diego—Monterey?

490 **Trochiscus convexus** *Cpr.*
"Monterey," (Jewett coll.)

491 **Chlorostoma funebrale** *A. Ad.*
Str. Fuca to San Diego—Sitka.

492 **Chlorostoma funebrale** *var.* **suba-**
Neeah Bay, W. T. (Young?) **[pertum** *Cpr.*

493 **Chlorostoma gallina** *Fbs.*
Cruz I., Cal., to Margarita Bay, Lower Cal.

494 **Chlorostoma gallina** *var.* **pyriformis**
San Diego. [*Gld.*

495 **Chlorostoma brunneum** *Phil.*
Cape Mendocino to Santa Barbara.

496 **Chlorostoma Pfeifferi** *Phil.*
Baulines Bay to Nicolas I., Cal.

497 **Chlorostoma aureotinctum** *Fbs.*
Monterey? Santa Barbara to Lower Cal.

498 **Omphalius fuscescens** *Phil.*
Catalina I. to San Diego, Cal.

499 **Calliostoma canaliculatum** *Mart.*
Str. Fuca to San Diego, Cal.

500 **Calliostoma costatum** *Mart.*
Str. Fuca to Barbara I., Cal.—Sitka.

501 **Calliostoma annulatum** *Mart.*
Str. Fuca to San Diego.

502 **Calliostoma variegatum** *Cpr.*
Str. Fuca, W. T.

503 **Calliostoma tricolor** *Gabb.*
New Year Point to San Diego.

504 **Calliostoma supragranosum** *Cpr.*
Santa Cruz to Monterey.

505 **Calliostoma gemmulatum** *Cpr.*
San Pedro to San Diego.

506 **Calliostoma splendens** *Cp*
Monterey to Catalina I.

507 **Thalotia caffea** *Gabb.*
Monterey, 20 fms. (S. Barb. and S. Pedro, F.)

508 **Phorcus pulligo** *Mart.*
Str. Fuca to Monterey—Sitka.

509 **Gibbula parcipicta** *Cpr.*
Str. Fuca to Santa Barbara.

510 **Gibbula optabilis** *Cpr.*
San Pedro, Cal.? (1, Palmer coll.)

511 **Gibbula funiculata** *Cpr.*
Neeah Bay, W. T.

512 **Gibbula succincta** *Cpr.*
Str. Fuca to Barbara I., Cal.

513 **Gibbula lacunata** *Cpr.*
Neeah Bay, W. T.

514 **Solariella peramabilis** *Cpr.*
Catalina I., 40—120 fms.

515 **Margarita cidaris** *A. Ad.*
Neeah Bay, W. T.

516 **Margarita pupilla** *Gld.*
Str. Fuca to Monterey.

517 **Margarita pupilla** *var.* **salmonea** *Cpr.*
Monterey to Catalina I.

518 **Margarita acuticostata** *Cpr.*
Baulines Bay to Santa Barbara.

519 **Margarita inflata** *Cpr.*
Str. Fuca, W. T.

520 **Margarita lirulata** *Cpr.*
Str. Fuca to Baulines Bay.

521 **Margarita Vahlii** *Moll.*
Str. Fuca, W. T.—Greenland.

522 **Margarita tenuisculpta** *Cpr.*
Str. Fuca, W. T.

523 **Margarita helicina** *Mont.*
Neeah Bay, W. T.—North Atlantic.

524 **Galerus fastigiatus** *Gld.*
Puget's Sound to Str. Fuca—Vancouver's I.

525 **Galerus contortus** *Cpr.*
Lobitos Creek to Santa Barbara.

526 **Crucibulum spinosum** *Sby.*
San Pedro south to Peru, South America.

527 **Crucibulum scutellatum** *Gray.*
Santa Cruz, Cal.—Lower Cal. to Peru.

528 **Crepidula aculeata** *Gmel.*
Monterey south—Asia—Atlantic.

529 **Crepidula dorsata** *Brod.*
Str. Fuca to Santa Barbara ?—Peru.

530 **Crepidula dorsata** *var.?* **lingulata** *Gld.*
Str. Fuca to Mazatlan.

531 **Crepidula excavata** *Brod.*
Santa Barbara ? Sitka ? Mexico to Peru.

532 **Crepidula adunca** *Sby.*
Str. Fuca to Santa Barbara—Mexico ?

533 **Crepidula rugosa** *Nutt.*
Sta. Barbara to S. Diego—Mex. to Peru ?

534 **Crepidula navicelloides** *Nutt.*
Str. Fuca to Santa Barbara.

535 **Crepidula navicelloides** *var.* **num-**
Str. Fuca to San Pedro. **[maria** *Gld.*

536 **Crepidula navicelloides** *var.* **fimbri-**
Str. Fuca. **[ata** *Rve.*

537 **Crepidula navicelloides** *var.* **explan-**
Str. Fuca to San Pedro. **[ata** *Gld.*

538 **Hipponyx cranioides** *Cpr.*
Str. Fuca to Santa Barbara.

539 **Hipponyx antiquatus** *Linn.*
Monterey south ?—S. America. Atlantic.

540 **Hipponyx serratus** *Cpr.*
Santa Barbara south—Mazatlan.

541 **Hipponyx tumens** *Cpr.*
Monterey to San Diego and islands.

542 **Serpulorbis squamigerus** *Cpr.*
Santa Barbara to San Diego.

543 **Bivonia compacta** *Cpr.*
Neeah Bay, W. T.

544 **Petaloconchus macrophragma** *Cpr.*
San Diego to Panama.

545 **Spiroglyphus lituella** *Morch.*
Santa Barbara to Cape St. Lucas.

546 **Cœcum crebricinctum** *Cpr.*
Monterey to San Diego.

547 **Cœcum Cooperi** *Cpr.*
San Diego Bay, 8—10 fms.

548 **Turritella Cooperi** *Cpr.*
Santa Barbara to San Diego.

549 **Turritella Jewettii** *Cpr.*
Santa Barbara; (Jewett coll., fossil?)

550 **Mesalia lacteola** *Cpr.*
Puget's Sound to Vancouver's I.

551 **Mesalia lacteola** *var.?* **subplanata** *Cpr*
Str. Fuca, W. T.

552 **Mesalia tenuisculpta** *Cpr.*
San Diego Bay, 4—6 fms., mud.

553 **Cerithidea sacrata** *Gld.*
Baulines Bay to San Diego—Mazatlan?

554 **Bittium filosum** *Gld.*
Str. Fuca to Monterey.

555 **Bittium filosum** *var.?* **esuriens** *Cpr.*
Str. Fuca to San Pedro.

556 **Bittium attenuatum** *Cpr.*
Str. Fuca to Monterey.

557 **Bittium quadrifilatum** *Cpr.*
Monterey to San Diego.

558 **Bittium asperum** *Cpr.*
Santa Barbara to Catalina I.

559 **Bittium armillatum** *Cpr.*
Farallone Is. to San Diego.

560 **Bittium fastigiatum** *Cpr.*
Santa Barbara; (Jewett coll.)

561 **Goniobasis occata** *Hds.*
Upper Sacramento River.

562 **Goniobasis plicifera** *Lea.*
Willamette R., Oregon, to Montana.

563 **Goniobasis rudens** *Rve.*
Sacramento and Columbia Rivers.

564 **Goniobasis silicula** *Gld.*
Shasta R., Cal., north, near coast.

565 **Goniobasis Bairdiana** *Lea.*
"Near Astoria," Oregon. (Expl. Exp.)

566 **Goniobasis Draytonii** *Lea.*
Napa and Butte Counties, Cal.—Oregon.

567 **Goniobasis nigrina** *Lea.*
Napa Co. to Shasta Co., Cal.

568 **Goniobasis rubiginosa** *Lea.*
"Oregon," Newcomb Mus., (Lea.)

569 **Goniobasis circumlineata** *Tryon.*
San Antonio Creek to Pit River, Cal.

570 **Goniobasis Newberryi** *Lea.*
Upper Des Chutes R., Oregon.

571 **Goniobasis bulbosa** *Gld.*
"Columbia R." (upper?) Expl. Exp.

572 **Litorina planaxis** *Nutt.*
Mendocino to San Diego—Sitka?

573 **Litorina Sitkana** *Phil.*
Str. Fuca to Monterey—Sitka—Asia?

574 **Litorina scutulata** *Gld.*
Str. Fuca to San Diego.

575 **Assiminea? subrotundata** *Cpr.*
Neeah Bay, W. T.—Monterey.

576 **Paludinella?**
Neeah Bay, W. T.

577 **Lacuna vincta** *Mont.*
Str. Fuca, W. T.—North Atlantic.

578 **Lacuna porrecta** *Cpr.*
Neeah Bay, W. T., to Monterey.

579 **Lacuna porrecta** *var?* **effusa** *Cpr.*
Neeah Bay, W. T., to Lobitos, Cal.

580 **Lacuna porrecta** *var.* **exæquata** *Cpr.*
S. F.? Neeah Bay, W. T.

581 **Lacuna solidula** *Loven.*
Str. Fuca to San Pedro—Norway.

582 **Lacuna solidula** *var?* **compacta** *Cpr.*
Neeah Bay, W. T., to Monterey, Cal.

583 **Lacuna variegata** *Cpr.*
Neeah Bay, W. T.

584 **Lacuna unifasciata** *Cpr.*
Farallone Is. to Santa Barbara.

585 **Lacuna unifasciata** *var.* **aurantiaca**
Catalina I. [*Cpr.*

586 **Isapis fenestrata** *Cpr.*
Str. Fuca to San Diego.

587 **Isapis obtusa** *Cpr.*
Monterey to San Diego.

588 **Rissoina interfossa** *Cpr.*
Monterey to San Diego—deep water.

589 **Rissoina purpurea** *Cpr.*
Monterey? Santa Barbara to San Diego.

590 **Rissoa compacta** *Cpr.*
Str. Fuca, W. T.

591 **Rissoa acutelirata** *Cpr.*
Santa Barbara to San Diego.

592 **Rissoa? Cooperi** *Tryon.*
Monterey or San Diego. (Fresh water?)

593 **Rissoa? exilis** *Tryon.*
Santa Barbara or S. Diego. (Fresh water?)

594 **Alvania reticulata** *Cpr.*
Neeah Bay, W. T.

595 **Alvania filosa** *Cpr.*
Monterey, (from shell-washings.)

596 **Fenella pupoidea** *Cpr.*
Monterey, 20 fms., dead.

597 **Barleeia subtenuis** *Cpr.*
Baulines? S. Diego—Mazatlan, Panama?

598 **Barleeia subtenuis** *var?* **rimata** *Cpr.*
San Diego.

599 **Barleeia haliotiphila** *Cpr.*
Lower Cal.? ("On H. splendens," *Rwl.*)

600 **Amphithalamus inclusus** *Cpr.*
Santa Barbara to San Diego.

601 **Amphithalamus? lacunatus** *Cpr.*
San Pedro. (Palmer coll.)

602 **Hydrobia? Californica** *Tryon.*
Oakland to Martinez, Cal.

603 **Amnicola? turbiniformis** *Tryon.*
Northeast California, in streams.

604 **Amnicola? longinqua** *Gld.*
Colorado Desert, (fossil only?)

605 **Fluminicola Nuttalliana** *Lea.*
Willamette River, Oregon, near mouth.

606 **Fluminicola fusca** *Hald.*
Sacramento R. to Green R., Utah.

607 **Fluminicola Hindsii** *Baird.*
Kootanie River, Montana.

608 **Fluminicola virens** *Lea.*
Willamette R., Oregon, near mouth.

609 **Bythinella? intermedia** *Tryon.*
Owyhee River, Southeast Oregon.

610 **Bythinella Binneyi** *Tryon.*
Near Baulines Bay, Cal.

611 **Cochliopa Rowellii** *Tryon.*
Clear Lake, California.

612 **Tryonia clathrata** *Stp.*
Colorado Desert, Cal.; fossil only ?

613 **Tryonia protea** *Gld.*
Colorado Desert, Cal.; fossil only ?

614 **Valvata virens** *Tryon.*
Clear Lake, California.

615 **Truncatella Californica** *Pf.*
San Pedro to San Diego—Mazatlan ?

616 **Jeffreysia Alderi** *Cpr.*
S. Diego—Cape St. Lucas to Mazatlan.

617 **Jeffreysia translucens** *Cpr.*
S. Diego. (*Barleeia* or *Rissoa ?*)

618 **Cythna albida** *Cpr.*
San Pedro—Mazatlan ? (=C. tumens *Cpr ?*)

619 **Diala marmorea** *Cpr.*
Monterey to San Pedro—Cape St. Lucas.

620 **Diala acuta** *Cpr.*
Monterey to Catalina I.

621 **Styliferina turrita** *Cpr.*
San Pedro; shell-washings. (Palmer coll.)

622 **Radius variabilis** *C. B. Ad.*
Santa Barbara ?—Lower Cal. to Panama.

623 **Luponia spadicea** *Sw.*
Santa Barbara to San Diego and islands.

624 **Trivia Californiana** *Gray.*
Monterey to San Diego and islands.

625 **Trivia radians** *Lam.*
S. Pedro—Lower Cal. to Peru.

626 **Trivia sanguinea** *Gray.*
Catalina I. 60 f.—Lower Cal. to Peru.

627 **Trivia Solandri** *Sby.*
Santa Barbara and S. Nicolas I. to Panama.

628 **Erato vitellina** *Hds.*
New Year Pt. to San Diego—Margarita Bay.

629 **Erato columbella** *Mke.*
Monterey to San Diego—Mazatlan.

630 **Terebra specillata** *Hds.*
San Pedro—Cerros Is. to San Blas, L. Cal.

631 **Myurella simplex** *Cpr.*
Santa Barbara to San Diego.

632 **Drillia inermis** *Hds.*
Santa Barbara to San Diego—Lower Cal.

633 **Drillia incisa** *Cpr.*
Str. Fuca, W. T., to Santa Cruz, Cal.

634 Drillia mœsta *Cpr.*
Santa Barbara to San Diego.

635 Drillia torosa *Cpr.*
Santa Cruz to Santa Barbara.

636 Drillia torosa *var?* **aurantia** *Cpr.*
San Pedro to Santa Barbara.

637 Drillia penicillata *Cpr.*
S. Pedro south—Cerros I. (=inermis *var?*)

638 Drillia cancellata *Cpr.*
Str. Fuca, W. T.

639 Surcula Carpenteriana *Gabb.*
Monterey to San Diego.

640 Pleurotoma perversa *Gabb.*
Catalina I. 60—120 fms., dead.

641 Mangelia levidensis *Cpr.*
Str. Fuca, W. T.

642 Mangelia tabulata *Cpr.*
Neeah Bay, W. T.

643 Mangelia interfossa *Cpr.*
Neeah Bay, W. T.

644 Mangelia crebricostata *Cpr.*
Neeah Bay, W. T.

645 Mangelia variegata *Cpr.*
Monterey to San Diego.

646 Mangelia variegata *var?* **nitens** *Cpr.*
Santa Barbara.

647 Mangelia angulata *Cpr.*
Str. Fuca to Santa Barbara.

648 Mangelia hexagona *Gabb.*
Monterey and Catalina I.

649 Clathurella
Catalina I.; San Diego. (No. 663-a.)

650 Clathurella constricta *Gabb.*
Catalina I. 80 f.

651 Clathurella crystallina *Gabb.*
Catalina I. 40 f.

652 Daphnella clathrata *Gabb.*
Catalina I. 60 f.

653 Bela fidicula *Gld.*
Str. Fuca, W. T.—Kamtschatka?

654 Bela excurvata *Cpr.*
Str. Fuca, W. T.

655 Mitromorpha aspera *Cpr.*
Monterey, Cal.

656 **Mitromorpha filosa** *Cpr.*
Monterey to Santa Barbara.

657 **Mitromorpha effusa** *Cpr.*
Neeah Bay, W. T.

658 **Conus Californicus** *Hinds.*
Farallone Is. to San Diego—Lower Cal.

659 **Obeliscus variegatus** *Cpr.*
San Diego—Cape St. Lucas; Guaymas.

660 **Odostomia nuciformis** *Cpr.*
Neeah Bay, W. T.

661 **Odostomia nuciformis** *var?* **avellana**
Neeah Bay, W. T. [*Cpr.*

662 **Odostomia satura** *Cpr.*
Neeah Bay, W. T.

663 **Odostomia satura** *var.* **Gouldii** *Cpr.*
Neeah Bay, W. T.

664 **Odostomia gravida** *Gld.*
Monterey to San Diego.

665 **Odostomia inflata** *Cpr.*
Neeah Bay to Farallone Is.

666 **Odostomia straminea** *Cpr.*
San Pedro to San Diego—Lower Cal.

667 **Odostomia tenuisculpta** *Cpr.*
Neeah Bay, W. T.

668 **Chrysallida cincta** *Cpr.*
Loc. uncertain, south of Monterey.

669 **Chrysallida pumila** *Cpr.*
Loc. uncertain, south of Monterey.

670 **Dunkeria laminata** *Cpr.*
Santa Barbara to San Diego.

671 **Chemnitzia tridentata** *Cpr.*
Str. Fuca to San Pedro.

672 **Chemnitzia chocolata** *Cpr.*
Monterey to San Diego.

673 **Chemnitzia chocolata** *var.* **aurantia**
Str. Fuca to Santa Barbara. [*Cpr.*

674 **Chemnitzia tenuicula** *Gld.*
Monterey to San Pedro.

675 **Chemnitzia tenuicula** *var?* **subcuspi-**
San Diego, 6 fms. [**data** *Cpr.*

676 **Chemnitzia crebrifilata** *Cpr.*
Santa Barbara.

677 **Chemnitzia torquata** *Gld.*
Str. Fuca to Santa Barbara.

678 **Chemnitzia torquata** *var.* **stylina** *Cpr.*
Monterey to Santa Barbara.

679 **Chemnitzia virgo** *Cpr.*
Santa Barbara.

680 **Chemnitzia Gabbiana** *Cp.*
Mt'y and Cat. I.? (=gracillima *Gabb* not *Cpr.*)

681 **Chemnitzia**
Monterey to San Pedro. (No. 459.)

682 **Chemnitzia**
San Diego, dredged. (No. 428 a.)

683 **Chemnitzia**
Monterey to Catalina I. (No. 421.)

684 **Chemnitzia**
San Diego, dredged (No. 671a.)

685 **Eulima micans** *Cpr.*
Str. Fuca to San Diego.

686 **Eulima compacta** *Cpr.*
San Diego (=micans *var.?*)

687 **Eulima rutila** *Cpr.*
Monterey (=micans *var.?*)

688 **Eulima thersites** *Cpr.*
Monterey to Santa Barbara.

689 **Scalaria Indianorum** *Cpr.*
Str. Fuca to Baulines; (and San Diego?)

690 **Scalaria Indianorum** *var?* **tincta** *Cpr.*
Santa Cruz to San Diego.

691 **Scalaria Cumingii?** *Cpr.*
San Diego or islands?—Panama.

692 **Scalaria gracilis?** *Sby.*
San Diego.

693 **Scalaria subcoronata** *Cpr.*
Baulines Bay to San Diego.

694 **Scalaria crebricostata** *Cpr.*
Monterey to San Diego.

695 **Scalaria bellastriata** *Cpr.*
San Pedro to San Diego.

696 **Opalia borealis** *Gld.*
Str. Fuca to San Pedro—Kamtschatka?

697 **Opalia crenatoides** *Cpr.*
Cape St. Lucas—Portugal?

698 **Opalia crenatoides** *var?* **insculpta** *Cpr.*
Santa Cruz to Santa Barbara.

699 **Opalia spongiosa** *Cpr.*
Monterey; shell washings, $\frac{1}{3}$ inch long.

700 **Opalia retiporosa** *Cpr.*
Catalina I. 40 fms.

701 **Opalia bullata** *Cpr.*
Santa Barbara.

702 **Cerithiopsis tuberculata** *Mont.*
Str. Fuca to Catalina I.—Europe.

703 **Cerithiopsis columna** *Cpr.*
Str. Fuca to San Diego.

704 **Cerithiopsis munita** *Cpr.*
Neeah Bay, W. T.

705 **Cerithiopsis fortior** *Cpr.*
Santa Barbara.

706 **Cerithiopsis assimilata** *C. B. Ad.*
Monterey to Panama.

707 **Triforis adversa** *Mont.*
Str. Fuca to Catalina I.—England.

708 **Cancellaria modesta** *Cpr.*
Neeah Bay, W. T.

709 **Cancellaria Cooperi** *Gabb.*
Monterey to San Diego.

710 **Trichotropis cancellata** *Hds.*
Str. Fuca and Puget Sound—Sitka.

711 **Trichotropis inermis** *Hds.*
Neeah Bay, W. T.—Sitka.

712 **Velutina lævigata** *Linn.*
Str. Fuca to Monterey—North Atlantic.

713 **Velutina prolongata** *Cpr.*
Str. Fuca to New Year Point.

714 **Natica clausa** *Brod. & Sby.*
Str. Fuca—Kamtschatka—North Atlantic.

715 **Lunatia Lewisii** *Gld.*
Str. Fuca to San Diego.

716 **Lunatia pallida** *Brod. & Sby.*
Str. Fuca—Circumboreal.

717 **Neverita Recluziana** *Petit.*
Monterey ? Catalina I. to Lower Cal.

718 **Sigaretus debilis** *Gld.*
Catalina I. 40 f.—La Paz, Lower Cal.

719 **Lamellaria**
Santa Cruz to Santa Barbara. (No. 1050.)

720 **Lamellaria**
Monterey.

721 **Lamellaria**
Monterey.

722 **Priene Oregonensis** *Redf.*
Str. Fuca to Monterey—Japan.

723 **Ranella Californica** *Hds.*
Monterey to San Diego.

724 **Mitra maura** *Sw.*
Farallone I. to San Diego—South America?

725 **Marginella Jewettii** *Cpr.*
Monterey to Santa Barbara.

726 **Marginella subtrigona** *Cpr.*
Monterey to Santa Barbara.

727 **Marginella regularis** *Cpr.*
Monterey to San Diego.

728 **Marginella pyriformis** *Cpr.*
Monterey to San Diego.

729 **Volvarina varia** *Sby.*
Santa Barbara to San Diego—Mexico; W. I.

730 **Olivella biplicata** *Sby.*
Str. Fuca to San Diego.

731 **Olivella bœtica** *Cpr.*
Str. Fuca to San Diego—Sitka.

732 **Olivella dama** *Mawe.*
San Pedro—Gulf of Cal.

733 **Olivella intorta** *Cpr.*
Baulines Bay to Monterey; Gulf of Cal.?

734 **Nassa fossata** *Gld.*
Str. Fuca to San Diego.

735 **Nassa perpinguis** *Hds.*
S. F. Bay to San Diego; Margarita Bay.

736 **Nassa insculpta** *Cpr.*
Catalina I., California.

737 **Nassa mendica** *Gld.*
Str. Fuca to San Diego.

738 **Nassa Cooperi** *Fbs.*
Baulines Bay to San Diego.

739 **Nassa tegula** *Rve.*
Santa Barbara to San Diego—Lower Cal.

740 **Amycla carinata** *Hds.*
Baulines Bay to San Diego.

741 **Amycla carinata** *var?* **Hindsii** *Rve.*
Neeah Bay to San Diego.

742 **Amycla gausapata** *Gld.*
Str. Fuca to San Diego.

743 **Amycla gausapata** *var?* **Californiana**
Santa Cruz to San Diego. [*Gask.*

744 **Amycla tuberosa** *Cpr.*
Neeah Bay to San Diego.

745 **Amycla chrysalloidea** *Cpr.*
San Pedro and San Diego.

746 **Amycla undata** *Cpr.*
Catalina I.

747 **Amphissa corrugata** *Rve.*
Str. Fuca to San Diego.

748 **Purpura crispata** *Chem.*
Str. Fuca to Oregon—Sitka.

749 **Purpura crispata** *var.* **septentrionalis**
Santa Barbara north. [*Rve.*

750 **Purpura canaliculata** *Ducl.*
Str. Fuca to Monterey—Behring's Straits.

751 **Purpura saxicola** *Val.*
Str. Fuca to S. Barbara—Lower Cal.?

752 **Purpura saxicola** *var.* **fuscata** *Fbs.*
Str. Fuca to Santa Cruz, Cal.

753 **Purpura saxicola** *var.* **ostrina** *Gld.*
Str. Fuca to Santa Barbara.

754 **Purpura saxicola** *var?* **emarginata**
S. F. Bay to S. Diego—N. Zealand? [*Desh.*

755 **Purpura triserialis** *Blainv.*
Santa Barbara to San Diego—Mexico.

756 **Monoceros engonatum** *Conr.*
Baulines Bay to San Diego.

757 **Monoceros engonatum** *var?* **spiratum**
San Pedro to San Diego. [*Blainv.*

758 **Monoceros lapilloides** *Conr.*
Monterey to Catalina I.

759 **Ocinebra lurida** *Midd.*
Str. Fuca to Catalina I. —Sitka.

760 **Ocinebra lurida** *var.* **aspera** *Baird.*
Str. Fuca to Baulines Bay—Sitka.

761 **Ocinebra lurida** *var.* **munda** *Cpr.*
Str. Fuca to Baulines Bay.

762 **Ocinebra lurida** *var?*
Santa Barbara to Catalina I.

763 **Ocinebra interfossa** *Cpr.*
Str. Fuca to Monterey.

764 **Ocinebra interfossa** *var.* **atropur-**
Str. Fuca to Monterey. [**purea** *Cpr.*

765 **Ocinebra interfossa** *var.*
Santa Barbara to Catalina I.

766 **Ocinebra interfossa** *var.*
Santa Cruz to San Diego.

767 **Ocinebra Poulsoni** *Cpr.*
Santa Barbara?—Cerros Is.; Panama?

768 **Cerostoma foliatum** *Gmel.*
Str. Fuca to Santa Barbara—Asia?

769 **Cerostoma Nuttalii** *Conr.*
Baulines Bay to San Diego.

770 **Cerostoma monoceros** *Sby.*
California? Lower Cal., and Mexico.

771 **Chorus Belcheri** *Hds.*
Catalina I. to San Diego; Lower Cal.

772 **Nitidella Gouldii** *Cpr.*
Str. Fuca to San Diego.

773 **Pedicularia Californica** *Newc.*
Farallone Is., on coral, deep water.

774 **Pteronotus festivus** *Hds.*
San Pedro and San Diego—Lower Cal.

775 **Muricidea incisa** *Brod.*
Cruz I. to Catalina I.; Mexico; Panama.

776 **Muricidea Californica** *Hds.?*
Baulines Bay to San Diego.

777 **Muricidea Barbarensis** *Gabb.*
Santa Barbara to Catalina I.

778 **Trophon multicostatus** *Esch.*
Str. Fuca to Monterey—Sitka; Greenland.

779 **Trophon Orpheus** *Gld.*
Str. Fuca, W. T.—Vancouver's I.

780 **Trophon triangulatus** *Cpr.*
Cruz I. to Catalina I.

781 **Siphonalia Kelletii** *Fbs.*
Santa Barbara to San Diego—Japan.

782 **Siphonalia fuscotincta** *Cpr.*
Monterey to Catalina I.

783 **Chrysodomus tabulatus** *Bd.*
Str. Fuca to Catalina I.

784 **Chrysodomus liratus** *Mart.*
Str. Fuca—Sitka; Kodiak I.

785 **Chrysodomus dirus** *Rve.*
Str. Fuca to Monterey—Sitka.

786 **Chrysodomus rectirostris** *Cpr.*
Str. Fuca, east end, or Puget's Sound.

787 **Fusus ambustus** *Gld.*
Santa Barbara to San Diego—Mazatlan.

788 **Fusus geniculus** *Conr.?*
Farallone Is. to Cruz I. (Oregon, *foss.*)

789 **Macron Kelletii** *A. Ad.*
California? Cerros Is. and Lower Cal.

790 **Macron lividus** *A. Ad.*
San Diego; (Farallone Is.?)—Lower Cal.

791 **Anachis subturrita** *Cpr.*
San Diego (shell washings.)

792 **Anachis penicillata** *Cpr.*
Santa Barbara to San Diego.

793 **Argonauta Argo** *Linn.*
Cruz I., south—Middle Atlantic.

794 **Octopus punctatus** *Gabb.*
San Francisco Bay to San Diego—Lower Cal.

795 **Ommastrephes giganteus** *D'Orb.*
Clemente I., Cal.—South America.

ADDITIONAL SPECIES FROM SITKA, ETC.*

796 **Mya arenaria** *Linn.*
Sitka to Kamtschatka—North Atlantic.

797 **Astarte corrugata** *Brown.*
Sitka—Circumpolar.

798 **Placunanomia patelliformis** *Linn.*
Sitka?—Europe.

799 **Æolis? crassicornis** *Esch.*
Sitka.

800 **Æolis? subrosaceus** *Esch.*
Sitka.

801 **Eolidia pinnata** *Esch.*
Sitka.

802 **Dendronotus arborescens** *Mull.*
Str. Fuca? Sitka—Circumpolar.

803 **Planorbis Hornii** *Tryon.*
Fort Simpson, lat. 54° 40'.

804 **Dentalium politum** *Linn.?*
Sitka—North Atlantic.

805 **Tonicia? insignis** *Rve.*
Sitka.

806 **Tonicia? Brandtii** *Midd.*
Sitka.

807 **Tonicia? Sitkensis** *Midd.*
Sitka.

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* These species complete the list of known Mollusca of the temperate and boreal faunæ of our coast, and many of them may yet be found south of lat. 49°. Others will doubtless prove identical with species of the first list, or to have been wrongly located on our coast. By adding to them all mentioned before as found either at Sitka or on each side of that place, the Mollusca of the locality may be approximately known. It is likely that several Arctic species also occur there, besides those mentioned in the first list, as there are no fixed limits to the regions, though pretty well separated by the peninsula of Aliaska. Some of the Lower California species, especially terrestrial, may be found to be limited to the temperate zone, but this is yet undecided.

808 **Tonicia? Escholtzii** *Midd.*
Sitka.

809 **Lepidopleurus? lividus** *Midd.*
Sitka.

810 **Lepidopleurus? scrobiculatus** *Midd.*
Sitka? "California."

811 **Lepeta cœca** *Mull.*
Sitka—Japan—North Europe.

812 **Haliotis aquatilis** *Rve.*
Sitka?—Japan.

813 **Margarita arctica** *Leach.*
Sitka; "*var.* major."

814 **Crepidula grandis** *Midd.*
Sitka to Asia; (=princeps *Conr. foss?*)

815 **Lacuna glacialis** *Moll.*
Sitka—Circumpolar.

816 **Litorina grandis** *Midd.*
Fort Simpson, lat. 54° 40'—Asia.

817 **Velutina Sitkensis** *A. Ad.*
Sitka.

818 **Chrysodomus tenebrosus** *Hanc.*
Sitka—Lapland.

819 **Chrysodomus carinatus** *Dunk.*
Sitka.

820 **Chrysodomus Morchianus** *Dunk.*
Sitka.

821 **Chrysodomus rutilus** *Moreh.*
Sitka.

822 **Chrysodomus Rombergi** *Dunk.*
Sitka.

823 **Chrysodomus harpa** *Moreh.*
Sitka.

824 **Chrysodomus castaneus** *Morch.*
Sitka.

825 **Volutharpa ampullacea** *Midd.*
Sitka—Asia.

NEW CALIFORNIAN SPECIES.

163a **Pisidium Angelicum** *Rwl.*
Angel I., Cal. (Rowell coll., Apr. 1867.)

N. B.—Persons receiving two or more copies of this catalogue, will confer a favor by returning one by mail to the State Geologist, with such notes as they may be able to add, for publication in the final report, where all such assistance will be duly acknowledged. In consequence of the time necessary for completing the engravings, the report cannot be issued in less than two years.

AUTHORS' NAMES NOT GIVEN IN FULL IN THE CATALOGUE.—Anthony, Adams (A. & C. B.), Binney (A. & W. G.), Blainville, Broderip, Carpenter (*Cpr.*), Chemnitz, Conrad, Cooper (*W. & J. G. Cp.*), Davidson, Deshayes, D'Orbigny, Duclos, Dunker, Escholtz, Fabricius, Forbes, Gmelin, Haldemann, Hancock, Hanley, Lamarck, Linnæus, Menke, Middendorf, Moller, Montague, Muller, Newcomb, Nuttall, Pfeiffer, Philippi, Reeve, Redfield, Rowell, Sowerby, Stimpson, Swainson, Valenciennes.

No. 6.

REPORT UPON THE MOLLUSCA COLLECTED ON THE SURVEY.

(Pacific R.R. Surv

BY WILLIAM COOPER.

Class **MOLLUSCA**.—Shell-fish.

Family MURICIDAE.

MUREX FOLIATUS.

Murex foliatus, GMEL. Desh. Reeve, C. J. III, 12.
Murex monodon, ESCH. Zool. Atlas, Pt. II, p. 10, pl. 9, 10, f. 1, 1829.
Cerastoma monodon, CARPENTER, Report to Brit. Assoc. 1856, p. 345.
Cerastoma foliatum, IDEM l. c.
Hab.—Sitcha; Eschscholtz. Oregon; Kellett and Wood in Carp. p. 241. San Diego, (fossil?); Mr. Cassedy.

Sent from San Diego by Mr. Cassedy. Like others from the same locality which have b also found living, and some very remarkable species that have not, these specimens have appearance of fossil shells. Eschscholtz collected it at Sitcha, in lat. 58°, as quoted by Ree though the name he gives is omitted by the latter.

MUREX FESTIVUS.

Murex festivus, HINDS, Zool. Sulphur, pl. 3, f. 13, 14.—REEVE, C. I. Murex, pl. xxvi, f. 114.
Pteronotus festivus, CARP. Rep. Brit. Assoc. 1856, p. 345.
Hab.—Bay of Magdalena; Hinds. San Diego; Mr. Cassedy.

This well marked species, which was dredged alive by Mr. Hinds in the Bay of Magdal is found of much larger size at San Diego. Only dead shells were sent, appearing like fo or much weathered shells, but otherwise they entirely agree with Reeve's figure.

TRITON OREGONENSE.

Triton oregonense, REDFIELD, in Ann. Lyceum of Nat. Hist. of New York, IV, p. 165, pl. II, f. 2, (young?) 1839.
Tritonium (Buccinum) cancellatum, MIDDENDORFF, Beitrage, II, p. 164, pl. III, f. 1–4, (adult and young,) excl. Lam. 1849.
Fusus oregonensis, REEVE, C. I. pl. xvi, p. 61, (young,) 1845.
Fusus cancellatus, REEVE, l. c, p. 62, (adult.)
Triton oregonense, GOULD, U. S. Expl. Exped. Moll. & Shells.
Triton cancellatum, (oregonense,) CARP. Rep. p. 338.
Hab.—Straits of Juan de Fuca; Dr. Suckley, Mr. Gibbs, Dr. Cooper. Unalashka; Middendorff. Kamtschatka; Reev

Among the specimens from the Straits of De Fuca is one adult shell, exhibiting the toot fold on the upper part of the columella, as it appears in Middendorff's plate, the absenc

which in his specimen was relied upon by Mr. Redfield as a good means of distinguishing his species from *Triton cancellatum* of Lamark. Dr. Gould, from the notes of Mr. Couthouy and Dr. Pickering, has described the animal of each, the one collected at the Straits of Magellan and the other at Puget Sound, considering them entirely distinct.

Reeve, and Dr. Gould after him, quote Jay as the author of the species, and original describer in the annals of the Lyceum of New York. Middendorff and Carpenter call the author Say. The credit is really due to Mr. J. H. Redfield, as above cited.

CHRYSODOMUS ANTIQUUS.

Chrysodomus antiquus, SWAINSON? Carpenter, Rep. p. 343.
Murex antiquus, LINN. Syst. Nat. ed. 12, L Gmel. ed. 13.
Fusus antiquus, LAM. An. sans vert, ed. 2, IX, p. 447.
Tritonium (Fusus) antiquum, MIDD. Malacol. Ross. II, p. 131.
Trit. (Fus.) antiquum, var. *Behringiana*, MIDD. Reise, II, 224, pl. x, f. 3.

Hab —Straits of Juan de Fuca; Dr. Suckley. Behring's straits; Middendorff.

But one specimen of this species was obtained, which agrees with the variety from Behring's straits represented by Middendorff in his Reise, though showing still less carination on the penultimate whorl. The figures of his "varietates Behringianæ," in the "Beitrage," represent a different but allied variety.

CHRYSODOMUS MIDDENDORFII, n. s.

Tritonium (Fusus) decemcostatum, MIDD (nec. Say) Beitrage, II, p. 138, pl. iv, fig. 15, (the sculpture only.)—CARP. Rep. p. 217. Omitted in his Gen. Catalogue, p. 343.

Hab.—Straits of Juan de Fuca; Dr. J. G. Cooper. Kodiak, Kenai; Middendorff.

DESCRIPTION.—Shell light horn color, the ribs darker, within white, tinged with violet; solid, ventricose-fusiform, the whorls convex, planulate on the upper part, encircled with strong well marked and elevated ribs, three to four on the whorls of the spire, ten to twelve on the last whorl, some near the canal less distinct, with intervening striae, which are more distinct forward; canal somewhat curved, equalling in length about two-thirds the breadth of the aperture. Length, 2.6 inches; breadth, 1.5; length of aperture, 1.7 inch.

This species is strikingly different from *Fusus decemcostatus*, Say, in the convexity of *all* the whorls, as well as in the angle formed in the outer lip by the termination of the first rib. The upper part of the last whorl is planulate, meeting the whorl above nearly at a right angle, while in the eastern species the same part is broadly excavated, rising steeply towards the suture. In the latter the penultimate and smaller whorls are made concave by the excavation between the two ribs which they generally exhibit, while the new species shows four on the penultimate and three on the smaller whorls. In *F. decemcostatus* the first rib is stronger and more prominent than those below it, while in the new species it is less so. Philippi's figure of Say's shell represents a variety, and not the normal state of the species. Our specimen of the new species is furnished with twelve more or less distinct ribs. The eastern shell, (from the examination of one hundred and thirty specimens,) appears to have seldom more than seven to eight, rarely nine ribs.

Fusus spitzbergensis, Reeve, (in Belcher's Arctic Voyage, II, p. 395, pl. 32, f. 6, a. b.,) is an allied, but, judging from the figure and description of Mr. Reeve, a very different species.

A single specimen collected by Dr. Cooper on the shore of Whidby's island, in the Straits of Fuca, with that described by Middendorff, are all at present known of this interesting species, first pointed out to me by Dr. Gould as the *F. decemcostatus* of Middendorff.

No. 6.—REPORT UPON THE MOLLUSCA.—(Page 369.)

Page 369, line 10 from top, for "*J*" read "*I.*"

Page 372, line 20 from top, for "*Pruss*" read "*Purp.*"

Page 372, line 2 from bottom, for "*specimen*" read "*species.*"

Page 373, line 3 from top, for "*punctature*" read "*punctatum.*"

Page 373, line 6 from top, for "*uniden*" read "*brevidens.*"

Page 373, lines 21 and 22 from top, for "1836" read "1856."

Page 374, line 2 from bottom, for "*Abbaldingen*" read "*Abbildungen.*"

Page 375, line 13 from top, for "*perfection*" read "*perforation.*"

Page 376, line 5 from top, for "*synonomy*" read "*synonymy.*"

Page 376, line 6 from top, for "1857" read "1856."

Page 379, line 9 from top, for "*Sowerby;*" read "*Sowerby's.*"

Page 379, line 12, "OSTREA EDULIS?" Mr. Carpenter is of opinion that this is a distinct species, and on comparison with European specimens it does show differences.

Page 380, line 4 from top, omit the words between brackets.

Page 380, line 2 from bottom, for "*S*" read "*L.*"

Page 381, line 8 from top, for "*Philad*" read "*Philos.*"

Page 382, line 6 from bottom, for "*pelatii*" read "*petitii.*"

Page 382, line 3 from bottom, for "*synomomy*" read "*synonymy.*"

Page 383, lines 8, 7, 4, 2 from bottom, for "*Camellifera*" read "*Lamellifera.*"

Page 383, line 2 from bottom, for "*none*" read "*worn.*"

Page 383, line 11 from bottom, for "*large*" read "*larger.*"

Page 385, lines 4 and 3 from bottom, for "*Sphoenia*" read "*Sphaenia.*"

Page 385, "*Machaera Nuttalii.*" This shell is correctly figured and described in "Portlock and Dixon's Voyage Round the World:" London, 1789, Plate, fig. 2 and page 354, under the name of Solen patulus. It must therefore be called MACHAERA PATULA.

CHRYSODOMUS SITCHENSIS.

Chrysodomus sitchensis, CARP. Report to Brit. Assoc. 1856, p. 343.

Tritonium (*Fusus*) *sitchense*, MIDD. Malacol. Ross. II, p. 149, No. 14; pl. 2, figs. 5—8.

Hab.—Straits of Juan de Fuca, Dr. Suckley, G. Gibbs, esq; Sitka, Midd. after Eschscholtz.

Specimens of both mature and young shells were brought from the Straits of Fuca, where it appears to be rare. They agree, in all respects, with Middendorff's plate and description.

Family BUCCINIDÆ.

NASSA MENDICA.

Nassa mendica, GOULD, U. S. Expl. Exped. Mollusc & Shells, p. 263, and Atlas, fig. 331.

Hab.—Puget Sound, Dr. G. Suckley.

This as well as the following species appear to be rare.

NASSA GIBBSII, n. s.

DESCRIPTION.—Form short and moderately ventricose; whorls, six; the body whorl nearly equalling the spine in length, all cancellated, longitudinally ridged. Ridges, about 13 on each whorl, the intermediate furrows deep and equal in width to the ridges. Mouth subovate, canal spirally twisted.

Colors.—Inside of mouth dark purplish; epidermis smooth; olivaceous brown. Indistinct bands visible inside, which, under the epidermis, are found to be black or brown, varying in width and number, one usually distinct around the middle of whorl. Long. 0.40, lat. 0.25.

Five specimens of this Nassa more resemble *N. trivittata* than *N. mendica*, having the banding and shorter form of the former, their breadth being equal, but length proportionately much less than the latter, and, though smaller, their ridges are more strongly marked. Found dead along the shore at Port Townsend, Puget Sound. One only has a fresh appearance.

PURPURA LACTUCA.

Murex lactuca, ESCHSCHOLTZ, Zool. Atlas, II, p. 9; pl. ix, fig. 3, 1829.—MIDD. Beitrage, II, p. 120.

Murex ferrugineus, accidental variety, IDEM, id. pl. ix, p. 3.

Purpura septentrionalis, REEVE, Con. Icon. pl. x, p. 50.—JAY, in App. to Perry's Exp. to Japan, vol. II, pl. 5, figs. 16, 17.—CARPENTER, Rep. to Brit. Assoc. p. 340.

Muricidea lactuca, CARPENTER, Report, p. 345.

Hab.—Sitka, Eschscholtz; Puget Sound, Dr. Suckley & Mr. Gibbs; Shoalwater bay and Straits of Fuca, Dr. Cooper.

This is a remarkable and abundant species, which, with Reeve, we prefer to place in the genus Purpura. Like others of that genus, it is subject to many variations, of which analogous examples may be observed in *P. lapillus* more especially. The figures given by Eschscholtz, Jay, and Reeve, represent three of these varieties, the first being at one, and the third at the other extreme of the series. After a careful comparison of more than two hundred individuals, from various localities in Washington Territory, we find the gradation from one to the other so regular that we are forced to refer them all to one species, first established by Eschscholtz.

"This shell abounds in the middle parts of Shoalwater bay on rocks and oyster-beds, and also in the deeper parts of Puget Sound. It appears to feed on oysters and other animal substances. I have found one adhering to an oyster, which was perforated by a small, round hole near the apex, and through which the 'periwinkle,' as they are popularly called, appeared to be devouring the animal. They can live several days out of water in damp places.

"The amount of rugosity seems to depend entirely upon the *station* the specimens are found

in. I obtained the most perfect adhering to rocks below low water, in a place where they were not likely to be rolled. Those found on oyster-beds are usually smooth, even when quite small.

"The form, also, seems to vary considerably in different localities; some from Puget Sound being much larger and more elongated, though found also of the usual form near by."—J. G. C.

PURPURA OSTRINA.

Purpura ostrina, Gould, Expl. Exped. Shells., p. 244.—Idem Atlas, fig. 310; Carp. Rep. p. 340.
"*Purpura Freycinetii*," Middend.; non Desh.
Purpura decemecostata, Midd. Beitrage II, 116; pl. ix, f. 1, 2, 3.

Hab.—Straits of Fuca; Puget's Sound; Dr. Cooper.

Quite a different species from *P. Freycinetii*, of Deshayes, with which it was confounded by Middendorff, though he also named and described it as new. Whether his or Dr. Gould's name has the priority I have not the means of deciding. On rocks above low water mark, from the mouth of Hood's Canal to Straits of Fuca; common.

PURPURA LAPILLUS.

Purpura lapillus, Linn, Midd. Gould, Carpenter; op. cit.

Hab.—Sitka Ochotsk; White sea; Middendorff. Straits of Juan de Fuca; Puget's Sound; Dr. Cooper.

Equally common with the last species, and found together with it.

PURPURA EMARGINATA.

Purpura emarginata, Desh. Rev. Zool. 1839.—Magasin de Zool. Moll. pl. 25; 1841.—Reeve, C. I. Pruss. x, p. 46.—Carp. Rep. p. 340.
Purpura Conradi, Nutt. Mss., Jay's Catal. No. 8972.

Hab.—Upper California: Dr. Trask. San Diego; Lieut. Trowbridge.

This shell is, no doubt, a California species, whence several were sent by Dr. Trask. Mr. Reeve mentions specimens in the British Museum, collected by Mr. Nuttall in that country. There is probably an error in M. Deshayes statement that it inhabits New Zealand.

MONOCEROS ENGONATUM.

Purpura (*Monoceros*) *engonata*, Conr. in Journ. Acad. Phila. VII, p. 26; pl. 20, p. 17.
"*Monoceros engonatum*, Conr." Carp. Report, p. 201.
"*Monoceros unicarinatum*, Reeve, C. I. sp. 1; new, pl. I, f. 1; nec. syn. pl.; non Sowb. nec. Desh."—Carp. Rep. 201.
"*Monoceros unicarinatum*, Sowb. var." Jay, Cat. No. 9067. N. B.—The type is quoted by Dr. Jay as synonymous with *Purpura spirata*, Blainville.

Hab.—Bay of San Pedro, Upper California; Dr. Trask. Santa Barbara; Nuttall.

From the above citations, which might be further extended, it will be seen that there is much difference of opinion concerning the synonymy of this species. Our specimens, of which four were sent by Dr. Trask, agree entirely with Mr. Conrad's figure and description. They differ materially from Kiener's figure of *Purpura spirata* from the Sandwich Islands, and still more from Reeve's figure 2, specimen 1, of his plate I. At the same time they are possibly identical as species. This was first published by Mr Conrad in 1837.

MONOCEROS LAPILLOIDES.

Purpura (Monoceros) lapilloides, Conr, Journal Acad. Phil. VII, p. 264, pl. 20, fig. 18, 1837.
Monoceros punctature, Gray, in Zool. Voyage of Blossom, 1839.—Reeve C. I. pl. 1, f. 1, species 2, Jay Cat. No. 9065.
Hab.—Bay of San Pedro, Dr. Trask; Santa Barbara, Nuttall.

Very different from the preceding species, as shown in our specimens, although Mr. Carpenter is inclined to consider them, with *M. uniden* Conr. as three varieties of the same. The published figures represent, it is true, what might be regarded as intermediate states of one species.

COLUMBELLA GAUSAPATA.

Columbella gausapata, Gould, Proceed. Bost. Soc. Nat. Hist., III, p. 170, June, 1850.—Idem, U. S. Expl. Exped. Mol. & Shells, p. 369.—Atlas, fig. 337, Carp. Rep. p. 341.
Hab.—Oregon, Gould; Straits of de Fuca, Dr. Suckley.

COLUMBELLA VALGA.

Columbella valga, Gould, Proceed. Bost. Soc. III, p. 169.—Idem, Exped. Shells, p. 269.—Atlas, pl. 6, 338.
Hab.—Straits of de Fuca, Dr. Suckley.

The specimens sent of these two species were few and imperfect.

Family NATICIDÆ.

NATICA LEWISII.

Natica lewisii, Gould, in Proceedings Bost. Soc. II, p. 239, 1847.—Id. in U. S. Expl. Exped. Mollusca & Shells.
Natica herculea, Middendorff, Beiträge Mal. Ross, II, p. 97, pl. vii, f. 5–7, 1849.
Natica herculea, Carpenter, Rep. to Brit. Assoc. 1836, p. 336.
Natica lewisii, Carpenter, Rep. to Brit. Assoc. 1836, p. 336.
Hab.—Puget Sound, Washington Territory, Dr. J. G. Cooper, Dr. G. Suckley; Bodega bay, Cal., Middendorff.

This fine large species, the western analogue of our *N. heros*, varies considerably in form, being sometimes remarkably globose, and at others with the spire much produced. Mr. Carpenter has erred in assigning the priority to Middendorff's name, his second volume, which contains the shells, being dated two years after Dr. Gould's publication. The name of the first explorer and collector in Oregon merited such a perpetuation.

"This large shell is abundant throughout the northwest sounds, and is collected in great numbers by the Indians for food. From May to August it may be found crawling out above high water mark to deposit its eggs, which are enclosed in a curious structure of sand, shaped like a shallow bowl without a bottom, or still more like some glass lamp shades, and beautifully symmetrical, smooth, and perfect on *both sides.*"—J. G. C.

Family CERITHIADÆ.

POTAMIS PULLATUS.

Potamis pullatus, Gould, in App. to Report of Explorations in California, vol. V, p. 333, pl. xi, f. 23, 24.
Cerithidæ pullata, Carp. Rep. to Brit. Assoc. 1856, p. 325.
Hab.—Upper California, Dr. Trask.

This species, which occurs in several localities on the coast of California, appears to vary in the number of varices, relative length, and other minor particulars.

Family MELANIADÆ.

MELANIA PLICIFERA.

Melania plicifera, LEA, on fresh water and land shells in Trans. Phil. Soc. of Phil., pl. xxiii, f. 90.—CARPENTER'S Report, p. 325.

Hab.—Very common in rivers of Washington Territory.—J. G. C.

MELANIA SILICULA.

Melania silicula, GOULD, Proceed. Bost. Soc. II, p. 224, 1847; Exped. Shells, 46. Carp. Rep., p. 325.—IDEM, Expl. Exped. Shells, p. 141, fig. 164.

Hab.—Rivers of Washington Territory, Dr. Cooper; Nisqually and Oregon, Dr. Gould.

MELANIA SHORTAENSIS.

Melania Shortaensis, LEA, in literis.

Hab.—Willopah river, Dr. Cooper.

AMNICOLA NUTTALLIANA.

Paludina Nuttalliana, LEA, in Philos. Trans. pl. xxvi, f. 89.

Hab.—Columbia river, Dr. Cooper.

AMNICOLA SEMINALIS.

Paludina seminalis, HINDS, Zool. Sulph. p 59, pl. 16, f. 22.

Bithinia seminalis, CARP. Rep. p. 326.

Hab.—Upper California, Dr. Trask.

Family TURRITELLIDÆ.

TURRITELLA ESCHRICHTII.

Turritella eschrichtii, MIDDEND. Beitrage, II, p. 68, pl. xi. f. 1; Carp. Rep. 325.

Hab.—Puget Sound, Dr. Suckley, G. Gibbs, esq.; Arctic Sea, Middendorff.

A few specimens sent from Puget Sound agree in all respects with the figure and description given of this species by Middendorff, as cited above.

Family LITTORINIDÆ.

LITTORINA RUDIS.

Littorina rudis, GOULD, Stimpson, Shells of New England.

Littorina Barclayan? HINDS.

Hab.—Shoalwater bay to Straits of Fuca, Dr. Cooper, Dr. Suckley, G. Gibbs, esq.

Very abundant on the northwest coast, where it presents the same varied appearances as our eastern shell.

LITTORINA SCUTULATA.

Littorina scutulata, GOULD, Proceed. Bost. Soc. III, p. 83, March, 1849, Exped. Shells, p. 83.—IDEM, U. S. Expl. Exped. Moll. & Shells, p. 200, fig. 241.—CARP. Rep. p. 326.

Hab.—Puget Sound, Dr. Cooper; Puget Sound, Oregon, Dr. Pickering.

On rocks from the head of Puget Sound to the Straits of Fuca, having habits similar to those of *L. rudis*.—J. G. C.

LITTORINA PLANAXIS.

Littorina planaxis, NUTT. Sup. PHILIPP. Abbaldingen T. II, p. 201; Litt. Pt. IV, p. 16. Carp. Report, p. 326.

Hab.—San Luis Obispo, Dr. Antisell.

Family TURBINIDÆ.

TROCHUS FILOSUS.

Trochus filosus, WOOD, Ind. Test. Supp. pl. 5, f. 23, 1828.—CARPENTER, Rep. Brit Assoc p. 320.
Trochus ligatus, GOULD in Proceed. Bost. Soc. III, p. 91, 1847.—Exped. Shells, p. 185, fig. 207.
Trochus modestus, MIDDEN.? Beit II. pl. 85, p. X, f. 16, 17, 18, 1849.
Hab.—Straits of De Fuca, Dr. Cooper; Upper California, Dr. Trask.

Not very common. *T. modestus* of Middendorff is considerably smaller, but otherwise much resembles this species.

29. TROCHUS SCHANTARICUS.

Trochus schantaricus, MIDDEN. Beitrage II, 85, 12.—IDEM, Reise, p. 204, pl. xviii, f. 1–7.
Hab —Straits of Fuca, Dr. Cooper; Schantar islands in Sea of Ochotsk, Middendorff.

This small species appears to be abundant in the above locality, and numerous specimens were collected. They all exhibit more or less perfection beneath, and are uniform in size, which is much less than *T. filosus*. In other particulars the two are nearly allied.

Family HALIOTIDÆ.

HALIOTIS KAMTSCHATKIANA

Haliotis Kamtschatkiana, JONAS, REEVE, Con. Icon. III, f. 8.—CARPENTER, Rep. p. 320.
Hab.—Nootka Sound, Captain Russell.

Several specimens of this beautiful species of Haliotis were brought from Nootka Sound by Captain C. J. W. Russell, of which four were presented to us by Dr. Trask.

Young shells of *H. rufescens* bear considerable resemblance to this species, for which there is reason to think they have sometimes been mistaken. Among numerous specimens of Haliotis, sent to the Smithsonian Institution from different localities on the coast of California, I find none of this species from any more southern points than that given above, in latitude 49°. Mr. Carpenter also considers it doubtful as a California species.

HALIOTIS CORRUGATA, H. SPLENDENS, H. RUFESCENS, and H. CRACHERODII were sent from San Diego by Mr. Cassedy. *H. californiensis* must be rare, as none were obtained by any of our collectors or correspondents.

Family FISSURELLIDÆ.

FISSURELLA NIGROPUNCTATA.

Fissurella nigropunctata, SOWERBY, REEVE, op. cit.
Hab.—Santa Catalina, Dr. Trask; Gallapagos, Cuming; Panama, C. B. Adams.

Two specimens of this shell, hitherto only found in the Panama province, were sent by Dr. Trask as coming from the island of Santa Catalina, near the coast of Upper California.

FISSURELLA ASPERA.

Fissurella aspera, ESCHSCHOLTZ, CARP. Rep. 320, (*Glyphis.*)
Fissurella cratilia, GOULD?
Fissurella denseclathrata, REEVE?
Hab.—Upper California, Lieut. W. P. Trowbridge; Puget Sound, Dr. Gould.

Family PATELLIDÆ.

Very few shells of this family were collected. Among the imperfect specimens, of which they mostly consist, we can recognize, with some doubt, the following species, adopting the nomenclature of Mr. Carpenter, the best authority upon this branch of conchology. For an extended synonomy the reader is referred to his excellent "Report to the British Association, 1857."

NACELLA INSTABILIS, ACMÆA PELTA, A. PERSONA, A. SPECTRUM, A. SCABRA, A. ÆRUGINOSA, SCURRIA MITRA.

Family CHITONIDÆ.

We find in the collections sent home still fewer materials, either specimens or notes, relating to this family than to the previous one. The following were identified, and are chiefly from the coast of Oregon:

CHITON MUSCOSUS, C. SUBMARMOREUS, C. TUNICATUS, C. LIGNOSUS.

Family HELICIDÆ.

HELIX FIDELIS.

Helix fidelis, GRAY, in Proceed. Zool. Soc. 1834, Carp. p. 314.
Helix Nuttalliana, LEA, in Philos. Trans. 1838, pl. XXIII, f. 74.
Hab.—Washington Territory, Dr. Cooper.

"This beautiful species is apparently limited to the forests west of the Cascade mountains, where it is common under evergreens in the drier situations. I have found one sticking to a small tree about three feet from the ground, but do not know of its ascending trees habitually. Its eggs, white, pellucid, and as large as a duck shot, are deposited in April under rotten wood. Young specimens are very rare. I found this shell throughout the valleys from Vancouver to the Straits of De Fuca, and more rarely near the coast, where it is smaller in size."—J. G. C.

HELIX TOWNSENDIANA.

Helix Townsendiana, LEA, in Trans. Philos. Soc. pl. XXIII, f. 80.—CARP. Rep. p. 314.
Hab.—Washington Territory, Dr. Cooper.

"This is the most abundant species, especially along the coast, where, unlike most of our American forest snails, it frequents open prairies among the fern. It is particularly abundant on low, sandy bars just above high tide, which are covered with a deep, rich deposit of shell marl, and have been formerly favorite camping grounds of the Indians. These places, being very productive, are much cultivated by the whites; and immense numbers of this animal's shells are found when the grass and bushes are first burnt off. They continue to live in potato fields in the same places. The bare face of Cape Disappointment fronting the ocean is also a locality. I did not find this species about Puget Sound."—J. G. C.

HELIX COLUMBIANA.

Helix columbiana, LEA, in Trans. Philos. Soc. pl. XXIII, f. 75.—CARP. Report, p. 314.
Helix labiosa, GOULD, U. S. Expl. Exped. Moll. and Shells.
Hab.—Washington Territory, Dr. Cooper.

"This little species is found in wet stations about meadows, &c., from Vancouver to the coast, where it is most abundant, under drift logs, &c., high up on the meadows, which are occasionally overflowed by the tide. It is also rarely found under trees. I did not obtain any at Puget Sound."—C.

HELIX VANCOUVERENSIS.

Helix vancouverensis, LEA, in Trans. Philos. Soc. pl. XXIII, f. 72.

Hab.—Washington Territory; Dr. Cooper.

"*H. Vancouverensis* is found west of the Cascade mountains, most abundant under the alder groves along the coast in damp places; also occasionally with *H. Townsendiana.* The animal is entirely of a yellowish white color. Some are also found on Whidby's island."—C.

HELIX DEVIA.

Helix devia, GOULD, Exped., Shells, p. —.

Helix Baskervillei, PFR. REEVE, C. I. pl. —, f. —.

Hab.—Washington Territory; Dr. Cooper.

Inhabits damp woods near Vancouver. Only two specimens were found.—C.

HELIX TUDICULATA.

Helix tudiculata, BINNEY, Terrestrial Molluscs.

Hab.—Washington Territory; Dr. Cooper.

This is also a rare species in Washington Territory, and is found with the preceding.—C.

SUCCINEA NUTTALLIANA.

Succinea nuttalliana, LEA, Proc. Am. Phil. Soc., vol. II, p. 32; Trans. of ditto, vol. IX, p. 4; PFEIFFER, Mon. Hel. Viv. I, 523, III, 15; BINNEY, Terr. Moll. U. S. II, 81; pl. LXVIIa, fig. 4.

Found at Vancouver, where it is apparently rare, and was not observed alive.—C.

Family LIMACEÆ.

LIMAX COLUMBIANUS.

The Columbian Slug.

Limax columbianus, GOULD, in Binney's Terr. Moll. U. S., II, 43; pl. LXVI, fig. 1.—U. S. Ex. Exped. Moll., p. 3, fig. 1, a. b. c.

This large slug abounds in the dense damp spruce forests near the Pacific coast, and was not observed by me in the dry region east of the Cascade mountains. It is to be found during every month of the year in Washington Territory, being even more abundant in the rainy winter than in warmer seasons; its activity being checked only by severe cold, while it cannot bear continued drought.

It not unfrequently drops from the trees, but whether it ascends to any great height I have not observed. Though apparently offering a tempting meal to birds and other animals I never knew them to devour it.

This slug grows to the length of six inches, but shrinks to a third of that size in alcohol. Its

surface is smooth, not rugose, when alive, as represented in Dr. Binney's plate, and its color is a pale yellowish olive, usually more or less irregularly blotched with black.—C.

Family LYMNÆADÆ.

LYMNÆA UMBROSA.

Lymnæa umbrosa, GOULD.

Hab.—Lake Oyosa, on the Okanagan river, near lat. 49°; Dr. Cooper.

LYMNÆA EMARGINATA.

Lymnæa emarginata, SAY.

Hab.—Lake Oyosa, Washington Territory; Dr. Cooper.

LYMNÆA JUGULARIS.

Lymnæa jugularis, SAY.

Hab.—Lake Oyosa, Washington Territory; Dr. Cooper.

PHYSA ELONGATA.

Physa elongata, SAY.

Hab.—Near Puget Sound; Dr. Cooper.

PHYSA HETEROSTROPHA.

Physa heterostropha, SAY.

Hab.—Ponds in Washington Territory; Dr. Cooper.

PHYSA BULLATA.

Physa bullata, GOULD, MS.

Hab.—Lake Oyosa, Washington Territory; Dr. Cooper

ANCYLUS CAURINUS, n. s?

Hab.—Black river, near Puget Sound; Dr. Cooper.

PLANORBIS CORPULENTUS.

Planorbis corpulentus, SAY.

Hab.—Lake Oyosa, Okanagan river; Dr. Cooper.

PLANORBUS TRIVOLVIS.

Planorbis trivolvis, SAY.

Hab.—Near Vancouver; Dr. Cooper.

"Exceedingly abundant in shallow lakes about Vancouver, the dead shells lining the shores."—C.

PLANORBIS PLANULATUS, n. s.

Hab.—Lakes on Whidby's island; Dr. Cooper.

A small carinated species, flat above, convex below, having much the appearance of a *valvata*, found only in lakes on Whidby's island, at the entrance of Puget Sound.

Family BULLIDÆ.

BULLA NEBULOSA.

Bulla nebulosa, GOULD, SOWERBY, Thes. f. 79,80.

Hab.—Bay of San Pedro; Dr. Trask.

BULLA TENELLA.

Bulla tenella, ADAMS, SOWERBY, Thes. pl. 134, f. 104.

Hab.—Puget Sound; Dr. Suckley.

The habitat of Adams' shell is not known. A specimen from Puget Sound agrees very well with Sowerby; figure and description quoted above.

Family OSTREIDÆ.

OSTREA EDULIS.

Ostrea edulis, LINN. LAM.

Hab.—Shoalwater bay Wash. Terr.; Dr. Cooper.—Straits of Fuca and Puget Sound; Mr. Gibbs.

"Oysters are rare on most parts of the northwest coast, but there are a few localities in which they are found in abundance. One of these is Shoalwater bay, a little to the north of the mouth of Columbia river, where are to be found the conditions requisite for their existence and multiplication. The markets of San Francisco and all the coast southward are supplied from this bay. The oysters obtained here appear to differ little, if at all, from the common oyster of Europe, and possess the same peculiar coppery flavor remarked in the European mollusc when eaten for the first time.

In Puget Sound small oysters are found near the mouth of the Nisqually river and some others, but nowhere large enough to be of much value. They are said to grow larger at Vancouver Island, and very large ones have lately been discovered near the mouth of Hoods' Canal."—C.

ANOMIA MACHROSCHISMA.

Anomia macroschisma, DESH. Rev. Zool. 369. Mag. Zool. Pl. 34.—MIDD. Beit. iii, 6. Idem Reise, p. 242, Pl. XIX. fig. 1—5.

Placunanomia macroschisma, CARPENTER, Rep. p. 312.

Hab.—Straits of Juan de Fuca; G. Gibbs, esq. Nootka Sound; C. J. W. Russell.

Several very perfect specimens were collected at the Straits of Fuca, and sent to the Smithsonian Institution by Mr. Gibbs.

PECTEN CAURINUS.

Pecten caurinus, GOULD Proceed. Bost. Soc. iii., p. 345. Exped. Shells. 95. U. S. Exploring Exped. Moll. & Shells, p. 458. Atlas, fig. 569. CARPENTER, Rep. p. 311.

Hab.—Straits of Fuca; Dr. Suckley. G. Gibbs, esq. Port Townsend, Admiralty inlet, Oregon; Gould.

This fine pecten is found of a much larger size than that described by Dr. Gould. Of ten specimens collected by Mr. Gibbs, and sent to the Smithsonian Institution, one measures twenty three inches in circumference, with a diameter of nearly eight inches, and some others are nearly as large.

PECTEN VENTRICOSUS.

Pecten ventricosus, SOWB. Thes. No. 19, pl. 12, f. 18, 19, 26.
Pecten tumidus, SOWB. (von Tuet. seec. Zeiten) Proc. Zool. Soc. London, p. 109, 1852?
Hab.—Upper California; Dr. Trask. San Diego; Mr. Cassidy.

Family MYTILIDÆ.

MYTILUS EDULIS.

Mytilus edulis, LINN., LAM, GOULD, MIDD., CARPENTER.
Hab.—Shoalwater bay; Dr. Cooper.

"The common mussel of Europe and our own eastern coasts is found in Shoalwater bay in equal abundance, and presenting the same variations in color and markings as there. It is also common in the estuaries along the whole coast, and to the head of Puget Sound. They are eaten by the Indians, but less used than the large clams so abundant in the same places. I have also seen a very severe case of *urticaria* caused by eating them, probably from swallowing the beard. The same effect is sometimes observed in Europe and the United States."—C.

MYTILUS CALIFORNIANUS.

Mytilus californianus, CONR. Journ. Acad. Philad. VII, p. 242, pl. 18, f. 15.—CARPENTER, Rep. p. 309.
Hab.—Puget Sound, Port Townsend; Dr. Suckley, Mr. Gibbs. Upper California; Dr. Trask.

This shell ranges from California, northward, to the Straits of Fuca, and numerous specimens have been collected and sent to the Smithsonian Institution from various localities along the coast. Among them are some of all the various sizes, up to nine and a quarter inches long, but all exhibiting the peculiar marks described by Mr. Conrad. These characters are less obvious on the old and overgrown individuals, as might be expected, but, according to my observations, can always be traced.

MODIOLA CAPAX.

Modiola capax, CONRAD, Journ. Acad. Philad. VII, p. 242.—GOULD, CARPENTER, Rep. p. 309.
Hab.—Straits of Fuca; Mr. Gibbs, Dr. Cooper.

"Not a common species in this locality."—C.

MODIOLA FLABELLATA.

Modiola flabellata, GOULD, U. S. Expl. Exped. Moll. & Shells, p. 453, fig. 561.—IB. Proc. Bost. Soc. III, 343.
Hab.—Straits of Fuca and Puget Sound; G. Gibbs, esq.

This is a much larger and very different shell from *M. brasiliensis*, so common at Panama, with which Mr. Carpenter supposes it to be synonymous.—(Vid. Carp. Report, p. 210.)

LITHODOMUS.

A fine large species, unlike any described from this region, though approaching in some particulars *S. falcatus*, GOULD, was found in rocks near the mouth of the Umpqua river, Oregon, by Dr. Vollum, U. S. A., and sent to the Smithsonian Institution.

Family ARCADÆ.

ARCA GRANDIS.

Arca grandis, BROD. & SOWERBY; REEVE, C. I., pl. —, f. 4.—CARPENTER, Report, p. 310.
Hab.—San Diego; Mr. Cassidy.

A fine specimen of this remarkable *Arca*, preserved entire in alcohol, was sent to the Smithsonian Institution from San Diego by Mr. Cassidy, being the first instance in which it has occurred beyond the limits of the Panama province.

Family UNIONIDÆ.

MARGARITANA MARGARITIFERA.

Margaritana margaritifera, LEA, in Philad. Trans.
Mya margaritifera, LINN.
Margaritana fluviatilis, SCHUMACHER.
Alasmodonta falcata, GOULD, in Proc. Bost. Soc., N. H., III, p. 294.—IDEM, U. S. Exploring Ex., Mollus. & Sh., pp. 433, 434—CARP. Report, p. 309.

Hab.—Chehalis and other rivers of Washington Territory, Dr. Cooper. Shasta river, Oregon, Dr. Trask.

After a careful comparison of specimens from the above localities with others from the Atlantic States, as well as from Newfoundland and Europe, we are brought to the same conclusion as Mr. Lea, namely, that the northwestern shell is at most a slight variety of the well known *M. margaritifera* of Linnæus.

"This is the most abundant of the fresh water bivalves, and the only one I have been able to find in the Chehalis, the streams emptying into Puget Sound, and most branches of the Columbia. No species is found in the streams running into Shoalwater bay. The Indians east of the Cascade mountains eat these, food of any kind being acceptable to most of them."—C.

ANODONTA ANGULATA.

Anodonta angulata, LEA, in Philos. Trans.
Anodonta fœminalis, GOULD, U. S. Expl. Exped. Moll. and Shells, 436.—CARP. Rep., p. 309.
Hab.—Yakima river, Washington Territory, Dr. Cooper. Walla-Walla river, Oregon, Dr. Pickering.

Several perfect specimens of various ages were brought by Dr. Cooper from the above locality, where it appears to be plentiful.

ANODONTA OREGONENSIS.

Anodonta oregonensis, LEA, Philos. Trans.; pl. xxi, f. 67.—CARPENTER, Rep., p. 309.
Hab.—Rivers of Washington Territory; Dr. Cooper.

ANODONTA WAHLAMATENSIS.

Anodonta wahlamatensis, LEA, in Philos. Trans.; pl. xx, f. 64.—CARP. Rep., p. 309.
Hab.—Lagoons, Sacramento, Dr. Trask. Wahlamet river, Nuttall.

The Californian specimens sent by Dr. Trask are larger and finer than those from the more northern habitats.

Family CARDIADAE.

CARDIUM NUTTALLI.

Cardium Nuttalli, Conr. Jour. Acad. Phila. VII, p. 229; pl. 17, f. 3.—Middend. Beitrage, III, p. 39; pl. xvi, f. 1-5. Carp. Rep., p. 307.

Hab.—Shoalwater bay and Puget Sound; Dr. Cooper. San Francisco; Dr. Bigelow, Dr. Trask.

"This large shell is the most abundant of the clams in Shoalwater bay, and is very much used as food. It inhabits a mixture of sand and mud, a few inches from the surface, in all parts of the bay about half way between the shores and the large channels. The Indians are very expert in finding them, getting numbers where a stranger can see no sign of their existence, by feeling for them with a knife or flat stick. In July many come to the surface and die, perhaps from the heat of the sun."—C.

CARDIUM QUADRAGENARIUM.

Cardium quadragenarium, Conr. Jour. Acad. Phila. VII, p. 230; pl. 17, f. 5.—Carp. Rep. p. 307

Hab.—San Luis Obispo; Dr. Antisell, U. S. A.

A valve of this rare species was obtained by Dr. Antisell at the above locality.

Family LUCINIDAE.

LUCINA CALIFORNICA.

Lucina californica, Conrad, Jour. Acad. Phila. VIII, p. 255, pl. 20, fig. 1.—Carpent. Rep. p. 307.

Hab.—San Diego; Mr. Cassidy.

Family CYCLADIDAE.

CYCLAS, n. s.?

Dr. Gould enumerates two species of this genus from Oregon, *C. patella* and *C. egregia*. Not having met with any description, we are unable to determine whether either of them is identical with our's or not, or whether it may not be the same as one of our eastern species.

Hab.—Whidby's island, Straits of Fuca; Dr. Cooper. Pools near Steilacoom; Dr. Cooper.

Family VENERIDAE.

VENUS STAMINEA.

Venus staminea, Conr. Jour. Acad. Phila. VII, p. 250, pl. 19, fig. 14, 1837.

Venerupis petitii, Desh. Rev. Zool. p. 359, 1839.—Idem. Mag. de Zool. pl. 39, 1841.—Midd. Beit. III, 51, pl. XVII, fig 15-13.

Venus rigida, Gould, Proceed. Bost. Soc. N. H. III, p. 227, 1850.—Idem. U. S. Exploring Exped. Moll. and Shells, p. 420; Atlas, fig. 538.

Tapes diversa, Sowb. Thes. pl. 146, fig. 41. No. 65.—Carp. Rep. p. 306.

Tapes straminae, Carpenter, Rep. p. 196.

Saxidomus pelatii, Idem. Rep. p. 299.

Hab.—Shoalwater bay and Puget Sound; Dr. Cooper and Dr. Suckley. San Francisco; Dr. Trask. San Diego; Lieut. Trowbridge.

We have brought together the above synomomy after repeated examination and comparison of specimens from distant localities between the Straits of Fuca and San Diego. The northern shells are commonly but not invariably "ashy white," as described by Dr. Gould, some

exhibiting brown zig-zag marks, after the manner of the young *Venus mercenaria (V. notata*, Say.) Others from San Francisco, where they are sold in the markets as food, sometimes exhibit brown undulating cross lines, at others broad longitudinal bands. In size and outline they vary more or less, but in the characters of the teeth and hinge there is no material difference.

"*T. Straminea*, CONRAD?" of Sowerby, Thes. 72, fig. 151, is a different shell, which I have received from Panama, and consider it a variety of *V. histrionica*. Conrad has not used the name *straminea*. His name *staminea* is dropped by Carpenter in his general catalogue, *straminea* only being quoted.—(See Rep. 306.)

SAXIDOMUS NUTTALLI.

Saxidomus Nuttalli, CONR. Jour. Acad. Phila. VII, p. 249, pl. 19, fig. 13, 1837.

Venerupis gigantea, DESH. Rev. Zool. p. 359, 1839.—IDEM, Mag. de Zool.; pl. 43, (fossil?) 1841.—MIDDEN. Beit. III, p. 52, pl. xviii, f. 1–3.

Venus maxima, PHILIPPI, Abbild. II, t. 6, f. 1. 1846. Sowb. Thes., 46, f. 127.

Saxidomus gigantea, and *S. Nuttalli*, CARP. Rep. p. 299.

Hab.—Shoalwater bay and Puget Sound, Dr. Cooper; Bodega, California, Dr. Trask; Sitka, Middendorff; Kamschatka, Pot. & Mich., (Middendorff.)

"This, which somewhat resembles the *quahog* of the Atlantic coast, and is called by that name, is, however, much superior to it as food. It is found in the south part of Shoalwater bay *only*, and near the mouth of the Copalux. I have found it, also, common in Puget Sound. Its station is in somewhat hard sand, near low-water mark."—C.

There is also a variety of this shell found fossil in coast banks elevated ten feet above the sea level, which is very correctly represented in Deshayes' plate. The circumstance mentioned by Deshayes, of the encroachment of the ligament, destroying the teeth, is frequently observable, even in young shells. This species varies much in different localities, but chiefly in the exterior marking of the shell, the disk being sometimes brown, with rough concentric striæ, as described by Conrad; others, from Oregon, are much smoother, without regular striæ. But the most aberrant appearance is found in another variety that occurs fossil at Shoalwater bay, where it was collected by Dr. Cooper. This is well figured in Middendorff's work, as above cited, and less distinctly appears in Deshayes' figure. The specimen described by the latter (from California) appears to be fossil, as he suspected. Middendorff gives no such intimation regarding his.

A specimen from California measures 4.8 inches in breadth. A somewhat large, and very perfect specimen is most accurately figured and described by Anton, in the work of Philippi, above quoted, whence it is also copied by Sowerby.

VENUS CAMELLIFERA.

Venus camellifera, CONR. Jour. Acad. Phila. VII, p. 251, pl. 19, f. 19. 1837.

Venerupis cordieri, var. β DESH. Cat. Varn. p. 191, No. 1.

Petricola cordieri, DESH. Rev. Cuv. p. 358. 1839.

Rupellaria camellifera, CARP. Rep. p. 299.

Hab.—San Diego; Mr. Cassidy.

Several entire specimens, but none smooth, and one with perfect camellæ, were sent by Mr. Cassidy to the Smithsonian Institution.

Family MACTRIDÆ.

LUTRARIA MAXIMA.

Lutraria maxima, MIDDENDORFF, Beit. III, p. 66, pl. xix, f. 1–4. 1849.

Lutraria capax, GOULD, Proceed. Bost. Soc. N. H. III, p. 217. 1850.

Lutraria maxima, IDEM, U. S. Expl. Exped. Moll. and Shells, p. 395. Carp. Rep. p. 300.

Hab.—Shoalwater bay, Dr. Cooper; San Francisco, California, Dr. Trask; Sitka, Middendorff, (from Wosnessenskii.)

"This great *clam* (as all these edible bivalves are indiscriminately called) is found in Shoalwater bay, within a rather limited area near the mouth and along the larger channels. It is buried near two feet deep in hard sand, near low water mark, its long siphon reaching the surface and showing where it can be found. It also abounds in many parts of Puget Sound, up to near Olympia. It is excellent as food, and has always been one of the chief articles of winter stores to the Indians, who preserve the hard parts by stringing and then smoking them in their lodges. It attains to 7⅝ inches in breadth, and is very capacious.

Portions of the clay and sandstone cliffs surrounding the bay are perforated by the burrows of this animal at a height of ten feet above the present high water. All the other mollusca inhabiting the bay now are also found in these fossil beds; and two which are not found now were then common. There is no tradition among the Indians of the time of their elevation, and the ancient trees standing on the surface show no signs of the irregular upheavings which raised the former levels of low water, by successive stages, to a height now nearly one hundred feet above the sea."—C.

Family TELLINIDÆ.

TELLINA NASUTA.

Tellina nasuta, CONR. Journ. Acad. Phila. VII, p. 258.—MIDD. Beitrage, III, p. 61, 62.—IDEM, Reise, p. 256, pl. xxiii, f. 6–11.—SOWB. Thes. VI, p. 314, pl. 64, f. 224.—CARP. Rep. p. 302.

Hab.—Shoalwater bay, Dr. Cooper; Puget Sound, Dr. Suckley; San Francisco, Dr. Trask.

Rather a common species, whose range extends from Lower California to the Arctic regions, having been found by Eschscholtz at Sitka, and by Middendorff in the Sea of Okhotsk.

TELLINA EDENTULA.

Tellina edentula, BROD. & SOWB. Zool. Journ. IV, p. 363.—GRAY, Zool. of Beechey's Voy. p. 154, pl. 41, f. 5, and pl. 44, f. 7.—CARP. Rep. p. 301.

Hab.—Puget Sound, G. Gibbs; Oregon, Nuttall.

Several specimens of this large species were sent to the Smithsonian Institution by Mr. Gibbs. It was also found at the mouth of Columbia river by Mr. Nuttall. In old shells the teeth nearly disappear, but in younger examples they are long and strong, so that the name is not strictly applicable.

TELLINA BODEGENSIS.

Tellina bodegensis, HINDS, Zool. Voy. Sulph. p. 67, pl. 21, f. 2.—CARP. Rep. p. 302.

Hab.—Shoalwater bay, Dr. Cooper; mouth of the Umpqua river, Dr. Vollum, U. S. A.

This is much more rare than *T. nasuta* found in the same stations.

SANGUINOLARIA CALIFORNIANA.

Sanguinolaria californiana, Conr. Jour. Acad. Phila. VII, p. 230, pl. 17, f. 6, Carp. Rep. p. 301.

Hab.—Mouth of Columbia river; Dr. Cooper.

Rather common at the mouth of the Columbia and other rivers, and high up salt water creeks.—C.

Family SOLENIDÆ.

SOLEN SICARIUS.

Solen sicarius, Gould, Proceed. Bost. Soc. N. H. III, p. 214.—Idem, U. S. Expl. Exp. p. 387, atlas, fig. 501.—Carpent. Rep. p. 301.

Hab.—Puget Sound; Dr. Cooper.

A single dead shell found on the shore at the town of Steilacoom. It is probably abundant on the mud flats near the mouth of the Nisqually river.—C.

MACHAERA NUTTALLI.

Solen maximus, Wood, (nec Chemn.) Gen. Con. pl. 31, f. 3.—Idem, Ind. Test. pl. 3, f. 16.

Solecurtus nuttallii, Conr. Journ. Acad. Phila. VII. p. 234, pl. 17, f. 9.

Machaera costata, Midd. (nec Say) Beit. III, p. 78, pl. XXI, figs. 4–10.—Idem, Reise.

Machaera maxima, Gould, U. S. Expl. Exped.; Jay's Cat. No. 239.

Machaera nuttalli, Carpenter, Rep. p. 301.

Hab.—Seacoast of Washington Territory; Dr. Cooper.

This shell inhabits the sand immediately upon the sea-beach, burrowing about the edge of the usual low tide, where it can be dug up with little trouble, as it is only a few inches from the surface. It is considered, and justly, the best of the many fine eatable mollusca of the coast, excepting always the oyster. Severe storms wash up many of these shells, but they soon crack under the sun's rays, and the beautiful epidermis falls off.

This is the only truly marine mollusc I have been able to find on the sandy sea-beach near the Columbia river. It extends northward as far as the beach is sandy, but is not found, I believe, anywhere within the Straits of De Fuca.—C.

Family MYACIDÆ.

MYA CANCELLATA.

Mya cancellata, Conr. Journ. Acad. Phila. VII. p. 235, pl. 18, f. 2.—Jay Cat. No. 265.

Platyodon cancellatum, Conr. Journ. Acad. Phila. 1849.—Carp. Rep. p. 300.

Hab.—San Luis Obispo; Dr. Antisell.

Dead valves only were found.

SPHOENIA CALIFORNICA.

Sphoenia californica, Conr. Journ. Acad. Phil. VII, p. 234, pl. 17, f. 11.—Carp. Rep. p. 300.

Cryptomya californica, Conr. Journ. Acad. Phila. 1849, p. 208.

Hab.—San Francisco; Dr. Trask.

Family ANATINIDÆ.

MYTILIMERIA NUTTALLI.

Mytilimeria nuttalli, CONR. Journ. Acad. Phila. VII, p. 247. pl. 19, f. 5.—CARP. Rep. p. 301.

Hab.—San Diego; Lieutenant W. P. Trowbridge.

A small group of this curious shell, nestling in a white friable arenaceous substance, was received by the Smithsonian Institution through the kindness of Lieutenant Trowbridge.

Family PHOLADIDAE.

PHOLAS PENITA.

Pholas penita, CONR. Jour. Acad. Phila. VII, p. 237, pl. 18, f. 7, 1837.

Pholus concamerata, DESHAYES, Rev. Zool. p. 234, 1839.—IDEM, Mag. de Zool. pl. 17, 1840.

Parapholas penita, CONR. Jour. Acad. Phila. 1849, p. 214, CARP. Rep. p. 290.

Hab.—Shoalwater bay, Dr. Cooper; Straits of Fuca, Dr. Suckley; Oregon, mouth of Umpqua river, Dr. Vollum, U. S. A.

"A specimen was obtained from a piece of worn rock which drifted into the bay attached to the roots of *macrocystis*, the giant seaweed."—C.

From U. S. Expedition to Southern Hemisphere

LIST OF SHELLS BROUGHT HOME BY THE U. S. N. ASTRONOMICAL EXPEDITION.

Washington. 1853

BY AUG. A. GOULD.

CHITON ACULEATUS. Lin. Coquimbo.
" SPIRRIFERUS. Frembly.
" MAGNIFICUS. Desh.
" OLIVACEUS. Fremb.
" PERUVIANUS. Lamk.
" GRANASUS. Fremb.
" CUMINGII. Sowerb.
OLIVA PERUVIANA. Lamk. Coquimbo.
" " *var. Senegalensis.*
TURBO NIGER. Gray.
TROCHUS ATER. Lesson.
" ARAUCANUS. D'Orb.
MUREX CRASSILABRUM.
" HORRIDUS. Sowerb.
" BOIVINII. Kien.
FISSURELLA LATIMARGINATA. Sowerb.
CALYPTRÆA PILEUS.
" PERUVIANA.
LITTORINA PERUVIANA. Gray.
" ARAUCANA. D'Orb.
BULIMUS ERYTHROSTOMA. Sowerb.
ACMŒA VIRIDULA.
" *var.* ACHATES.
" SCUTUM. D'Orb. and Eschh.
" SCURRA. Less.
TRITON SCABER. King.
" RUDIS. Sowerb.
NASSA RUBRICATA. Gould.
MERADESMA DONACIA. Lamk.
CYTHEREA PANNOSA? D'Orb. Two or three shells are confounded under this name.
MYTILUS. *Undetermined.*
PLANORBIS. *Undetermined.*
DOMBEYA (CHILINA) FLUCTUOSA.
CARDIUM UNEDO.
" FRAGUM.
CONUS EBUMEUS.
RICIMULA HORRIDA.
" ALBILABRIS.
MONOCEROS CRASSILABRUM. Lamk.
OLIVA GULTATA.
" JASPIDEA.
" ELEGANS.
" FLAMMULATA?
STROMBUS GIBBERULUS.
CERITHIUM LINEATUM.
CYPREA MONETA.
" ANNULUS.
" CICERCULA.
" EBUMEA.
" FIMBRIATA.
VENUS PANNOSA. Sowerb.
TEREBRA CINEREA.
" STRIATA.
NERITA ALBICILLA.
" LE GRILLOUANA.
NERITINA CANALES. Sowerb.
SIPHONARIA LESSONI. Blainv.
NATICA UBER.
MELAMPUS. *Undetermined.*

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ARTICLE III.

CATALOGUE OF THE RECENT SHELLS, WITH DESCRIPTIONS OF THE NEW SPECIES.

Survey mus. Pacific Washington. 1857.

BY AUGUSTUS A. GOULD, M. D.

The collection consists of fresh water shells from the Colorado desert, and other localities, and of land and marine shells from the coast between San Francisco and San Diego. The new species are indicated by an asterisk.(*).

o.	Name.	Locality.
1	Ostrea.	San Diego
2	Pecten monotimeris, Conrad	do
3	Pecten ventricosus, Sowerby, (also tumidus, Sow.)	do
4	Mytilus edulis,(1)	San Francisco
5	Modiola capax, Conrad	San Diego
6	Venus Nuttallii, Conrad	San Pedro.
7	Venus fluctifraga, Sowerby	San Diego
8	Tapes grata, Say, T. discors., Sowerby, (straminea, Conrad)	San Pedro.
9	*Tapes gracilis, Gould	do
10	Cyclas, (imperfect)	Colorado Desert
11	*Cardium cruentatum, Gould	San Diego
12	Lucina orbella, Gould	San Pedro
13	Lucina Nuttallii, Conrad	do
14	Mesodesma rubrotincta, (?) Sowerby	do
15	Tellina vicina, Adams	San Diego
16	Tellina secta, Conrad	San Pedro
17	Sphenia Californica, Conrad	San Diego
18	Petricola carditoides, Conrad, (P. cylindracea, Desh.)	Monterey—San Pedro
19	Solecurtus Californiensis, Conrad.	San Diego
20	Gnathodon Lecontei, Conrad, (G. trigonum, Pettit)	Colorado Desert
21	Lottia scabra, Gould	San Francisco
22	Lottia patina, Eschscholtz	San Pedro
23	Scurria pallida, Gray, (Lott. mitra, Brod.)	do
24	Calyptrea hispida, Brod.	San Pedro—San Diego
25	Crepidula incurva, Brod.	San Pedro
26	Bulla nebulosa, Gould	San Diego
27	Bulla (Haminea) virescens, Sowerby	do
28	*Bulla (Haminea) vesicula, Gould	do
29	*Bulla (Tornatina) inculta, Gould	do
30	Trochus mœstus, Jonas	do
31	*Phasianella compta, Gould	do

CATALOGUE—Continued.

No.	Name.	Locality.
32	Littorina, (undetermined)	San Diego
33	Melampus, (undetermined)	do
34	Oliva biplicata, Sowerby	San Pedro
35	*Potamis pullatus, Gould	San Diego
36	*Amnicola protea, Gould	Colorado Desert
37	*Amnicola longinqua, Gould	do
38	*Planorbis ammon, Gould	Colorado Desert — Ocoya Creek
39	*Physa humerosa, Gould	Colorado Desert
40	Succinea, (undetermined)	Ocoya Creek
41	Helix Vancouverensis, Lea	San Francisco
42	Helix San Diegoensis, Lea	Point Reyes
43	Helix infumata, Gould	do
44	Helix Oregonensis, Lea	Cypress Point

I.—FRESH-WATER SHELLS FROM THE COLORADO DESERT.

PHYSA HUMEROSA, *Gould.*

[Proceed. Bost. Soc. Nat. Hist., V. 128. Feb. 1855.]

T. solidula, subrhomboidea, polita; spira acuta, anfractibus quinque tabulatis; apertura ½ ad ⅔ long; idtudinis testæ adequans, posticè obtusa; labro expanso, columellâ vix plicatâ.—Pl. XI, figures 1, 2, 3, 4, and 5.

Shell rather large and solid, subrhomboidal, polished; all the specimens seen, (quite numerous, and apparently not weathered,) porcelain white. Whorls five, each with a broad, square shoulder, and forming an elevated, acute spire; aperture usually about two-thirds the length of the shell, sometimes but little over one-half; posterior angle obtusely rounded; outer lip slightly flaring, when viewed in profile it is slightly advanced posteriorly so as to form a recess at the junction; pillar without any conspicuous fold, thickly covered with enamel, broadly rounded and expanded at the base. Umbilical region nearly perforate.

Length of an ordinary specimen, half an inch; breadth, three-eighths of an inch; length of a variety, seven-tenths of an inch.

Found in the Colorado Desert, by W. P. Blake; also at Pecos River, by Dr. T. H. Webb.

The broadly tabulated whorls, with the acute, elevated spire and foldless pillar, clearly distinguish this species. *P. tabulata*, Gould, from New Zealand, is similar, as well as some varieties of *P. ancillaria*, Say, as figured by Haldeman, especially his figure 7, which he designates as a monstrosity; but the spire is more elevated, and the deep suture always renders the whorls distinct, and the absence of a columellar fold is a still further distinctive mark. It would be difficult to distinguish the young by themselves from several other species, though they begin to show the angularity of the whorls quite early.

PLANORBIS AMMON, *Gould.*

[Proceed. Bost. Soc. Nat. Hist., V. 129. Mar. 1855.]

T. magna, discoidea, subconica, subtiliter striata; latere sinistro late et profundè concavo,

anfractus quatuor obtusè angulatos exhibente; latere dextro excavato, anfractus duos cum dimidio cstendente; apertura ovato-triangularis, interdum utroque valdè expansa.—Pl. XI, figures 12, 13, 14, 15, 16, 17, and 18.

Shell discoidal, attaining a large size, delicately striated, of a watery-white color; when laid upon the right side the shell has a remarkable conical or dome-shaped aspect, the extreme periphery being in a plane with the right side or base, from which the whorl grapually slopes upwards, terminating at the summit in a broad and deep concavity, exhibiting four well-marked, obtusely angulated whorls; the right side is decidedly concave, exhibiting two and a half or three well-rounded volutions. Aperture ovate-triangular, in middle-sized specimens projecting about equally to either side, in small specimens projecting to the right side only, and in the largest, spreading amply to both sides, and especially the right, where it expands and forms a remarkable ear-shaped aperture.

Diameter of the disk, in the middle-sized specimens, five-eighths of an inch, and in the largest, one inch; axial diameter of the first, one fourth of an inch, of the latter, half an inch; and in one specimen the breadth of the aperture, from side to side, is five-eighths of an inch.

Locality.—Found in the Colorado Desert; and also by Dr. Webb.

I have associated specimens differing greatly in size and in developement of the aperture, but all agreeing in the peculiar slope of the outer volution, giving a conical outline when lying on the side. The fully developed specimens have the general aspect of *P. corpulentus*, Say; but besides the form of the volution and the consequent shape of the aperture, that shell is more coarsely striated, the whorls on the right side lie nearly in the same place, and on the left side but two whorls appear. It differs from *P. trivolvis*, Say, in nearly the same particulars. In external surface it is more like *P. glabratus*, Say.

AMNICOLA PROTEA, *Gould.*

[Proceed. Bost. Soc. Nat. Hist., V. 129. Mar. 1855.]

T. parva, elongata, gracilis, variabilis; anfractibus 7–8 convexis, profundè discretis, simplicibus, vel filis volventibus et costis longitudinalibus variè ornatis et clathratis: apertura ovata; labro continuo, simplici, anfractum penultimum vix attigente. Pl. XI, figures, 6, 7, 8, and 9.

Shell small, turreted, slender, greatly elongated, chalky-white, (so far as seen,) variously proportioned, composed of seven or eight whorls, which are either convexly rounded or broadly shouldered, and separated by a deep suture—the surface either smooth throughout, or more frequently sculptured with revolving threads or longitudinal ribs or decussated by both in various proportions, the upper whorls being in nearly every instance decussated; aperture ovate, lip simple, continuous, generally detached from, or scarcely appressed to the penultimate whorl, in many instances leaving an umbilical chink.

Largest specimens three-tenths of an inch long and half an inch broad.

Found in the Colorado Desert; also by Dr. T. H. Webb.

This species is peculiar on account of its elongated, slender form, and differs from the other species of the genus yet described in being variously sculptured with revolving ridges and longitudinal folds, like many of the Melaniæ. It varies greatly also in its relative proportions of length and breadth. It is as slender as *A. attenuata*, Haldeman, and much larger. [This appears to be the same shell as that subsequently described by Mr. Conrad, under the name of *Melania exigua.*]

AMNICOLA LONGINQUA, *Gould.*

[Proceed. Bost. Soc. Nat. Hist., V. 130. Mar. 1855.]

T. parva, elongato-ovata, lævis, apice obtuso, spiræ anfractibus quinque rotundatis, suturâ profundâ discretis: apertura elliptica, postice rotundata; columellâ profundè arcuatâ.—Pl. XI, figures 10, and 11.

Shell small, elongate ovate, horn-colored, (or blanched chalky-white,) surface quite smooth; apex obtuse, whorls five, well-rounded and separated by a deep suture. Aperture elliptical, broadly rounded posteriorly; lip simple, copiously incrusting the pillar margin, which is profoundly arcuate; umbilical region nearly perforate.

Length one-eighth of an inch, breadth one-tenth of an inch.

Found in the Colorado Desert.

In form it is much like *A. Cincinnatiensis*, Haldeman, or like his *A. galbana*.

II. MARINE SHELLS FROM THE COAST.

POTAMIS PULLATUS, *Gould.*

[Appendix to Prelim. Geol. Report of W. P. Blake, 1855.]

Testa turrita, gracilis, solida, rudis, fusco-cinerea; anfractibus ad decem convexiusculis, plicis circiter decem convexiusculis arcuatis compressis instructis, et filis ad quinque volventibus cinctis; tribus ultimis varice munitis: apertura parva, subcircularis, nitidè rufo-nigra; basi vix effuso et contorto; labro expanso. Pl. XI, figures 23, 24.

Shell elongated, turreted, slender, solid, rough, and dusky, composed of ten closely revolving moderately convex whorls, ornamented with about 16 longitudinal, curved, compressed folds, and about five revolving threads, which usually form beads where they crown the folds; the three anterior whorls are fortified with a strong varix, about two-thirds of a volution distant from each other. Aperture small, nearly circular, slightly produced and contorted at base, very dark and glossy liver-brown within; everted.

Length 1¼ inch, breadth two-fifths of an inch.

Locality.—Brought from San Diego by Dr. Tho. H. Webb and Wm. P. Blake.

This shell is apparently very common, and yet I find no description answering to it. From *P. sacratum*, Gould, it may be distinguished by its small and dark-colored aperture, and the longitudinal folds. It is much like *P. iostoma*, Pfeiffer, a Cuban species. Some of the specimens are very much more slender than others.

PHASIANELLA COMPTA, *Gould.*

[Preliminary Report, 1855.]

Testa parva, solida, ovato-conica, imperforata, polita, cinerascens, lineis olivaceis tenuissimis obliquè volventibus ornata: spira acuta; anfractibus quatuor rotundatis; ultimo ad peripheriam obtusè angulato et interdum tessellatim fasciato: apertura circularis; labro tenui, albo; columellâ albâ, compressâ; faucibus callo albo incrassatis. Pl. XI, figs. 25, 26.

Shell small, solid, ovate, imperforate, smooth and shining, ashy white, minutely and closely lineated in an obliquely spiral manner with olive green. Whorls four, well rounded, forming an acute spire, the outer one obtusely angular at periphery, where there is sometimes a delicate range of catenated white and olive spots; aperture nearly circular; lip very thin, showing the

lineations on the inner margin; throat coated with bluish white enamel; pillar flattened; white. Operculum patelliform, ivory-like, the outer convex surface marbled black and white; the inner surface black.

Length one-fourth of an inch; diameter one-fifth of an inch.

Locality.—Found at San Diego by Mr. Blake, and also by Dr. Webb.

This pretty little shell is usually more or less coated with cretaceous matters, but when cleaned exhibits a beautifully lineated surface, peculiar on account of the lines running so nearly in the ordinary direction of revolving striæ. The coloration, however, sometimes consists of olive and white tessellations and blotches. It would accord pretty well with *P. perforata*, Philippi, did it not lack the distinguishing mark of that species, its perforation.

BULLA (TORNATINA) INCULTA, *Gould.*

[Preliminary Report, 1855.]

Testa minuta, solidula, eburnea, elongato-ovalis, longitudinaliter minutissimè striata: spira elevata; anfractibus quatuor tabulatis: apertura linearis, octantes septem longitudinis testæ adequans, anticè dilatata, posticè rotundata; labro incurvato; columellâ satis arcuatâ, callosa, uniplicatâ. Pl. XI, figures 27, 28.

Shell minute, solid, ivory white, elongated-oval, minutely striated longitudinally; spire elevated, consisting of about four tabulated whorls. Aperture about seven-eighths the length of the shell, not attaining the end of the outer whorl, linear, constricted at the middle and somewhat dilated anteriorly, posterior angle rounded; pillar moderately arcuate, usually presenting a well-marked fold at the anterior fourth, and well coated with enamel.

Length one-eighth; breadth one-twelfth of an inch.

Locality.—San Diego.

May be best compared with *B. fusiformis*, A. Adams, and is also very closely allied to *B. obstricta*. Gould. The spire varies much in elevation, sometimes, indeed, being on a level with the outer whorl. The form of the whole shell is also more or less cylindrical.

BULLA (HAMINEA) VESICULA, *Gould.*

[Preliminary Report, 1855.]

Testa parva, fragilis, ovato-globosa, pallidè citrina, posticè truncata: apertura spiram superans, longitudine duplo adequans, anticè et posticè benè rotundata; columellâ profundè arcuatâ, vix callosâ. Pl. XI, fig. 29.

Shell small, fragile, ovate globose, pale greenish yellow; body of the shell small, truncate at summit; outer whorl large; aperture about twice the length of the body of the shell, and projecting above it, broadly rounded both posteriorly and anteriorly; outer lip inflexed at the middle; pillar profoundly arcuate, with a narrow delicate callus.

Length three-tenths; breadth one-fifth of an inch.

Locality.—Brought from San Diego by Mr. Blake.

It has about the size and general appearance of *B. rotunda*, A. Adams, but has not so large a body, and is more open anteriorly; in this latter respect it is more like *B. Natalensis*, a much larger shell.

CARDIUM CRUENTATUM, *Gould.*

[Preliminary Report, 1855.]

Testa parva, tenuis, transversim rotundato-ovata, ventricosa, inequilateralis, polita, straminea,

ad aream dorsalem posticam rufo tincta, lineis radiantibus crebris vix insculpta; umbonibus eminentibus; extremitatibus rotundatis, rufo biradiatis; intus citrina sanguineo conspersa; margine argutè crenulato. Plate XI, figures 21, 22.

Shell small, thin, inequilateral, rounded ovate, moderately ventricose, surface smooth and shining, with very delicate lines of growth, and numerous, indistinct, radiating striæ, more distinct posteriorly and near the margin; anterior end broadly rounded; posterior end narrowed, semi-rhomboidal, the dorsal margin rather rapidly declining; color pale lemon, or straw-color, somewhat discolored or blotched with rufous, the beaks biradiate with brown, and the posterior dorsal area brownish; interior bright lemon-color, beautifully stained with dark liver-brown, especially near the beaks and posteriorly; inner margin minutely crenulated. Height and length five-eighths of an inch; breadth three-eighths of an inch.

Locality.—Inhabits San Pedro.—*Wm. P. Blake.*

Compared with *C. Elenense*, Sowb., it is much less elevated and differently colored, though the general characters are very closely allied. It is more like *C. Mortoni*, Con., but is less solid, inequilateral, less truncate posteriorly and more freely colored within, and the internal margin in that shell is not crenulated.

TAPES GRACILIS, *Gould.*

[Preliminary Report, &c., 1855.]

Testa parva, tenuis, inequilateralis, elongato-ovata, albida, obsoletè fusco radiata, ad aream dorsalem posticam fuscata, concentricè striolata; extremitatibus rotundatis, extr. antico acutiore; intus candida.—Pl. XI, figures 19, 20.

Shell small, thin, transversely elongate-ovate, rather compressed, beaks, at the anterior third, whitish, with traces of dusky radiations on the disks, and clouded with dusky on the dorsal areas; surface with very fine concentric lines of growth, coarser at the ends; extremities rounded, the posterior somewhat obliquely, the anterior narrower and somewhat more acute; anterior dorsal area depressed, without any line of demarcation; interior white.

Length three-fourths of an inch; height half an inch; breadth an eighth.

Locality.—Brought from San Pedro by Mr. Blake.

Belongs to the group with *T. florida* and *geographica*, but is less inequilateral and less angular than those shells. It may grow much larger than the present specimen, and is pretty certain to vary in coloring.

In addition to the preceding are two or three species left undetermined in consequence of imperfect specimens, or because the characters are not sufficiently marked to render their novelty decisive. The following remarks may be added in regard to some of these:

(1.) MYTILUS EDULIS, or very closely allied. It seems to differ in having the dorsal angle at a greater distance from the beak—the posterior dorsal slope more rapidly declining and more curved, as in M. *hamatus*—the interior more pearly, and the margin more uniformly deep black.

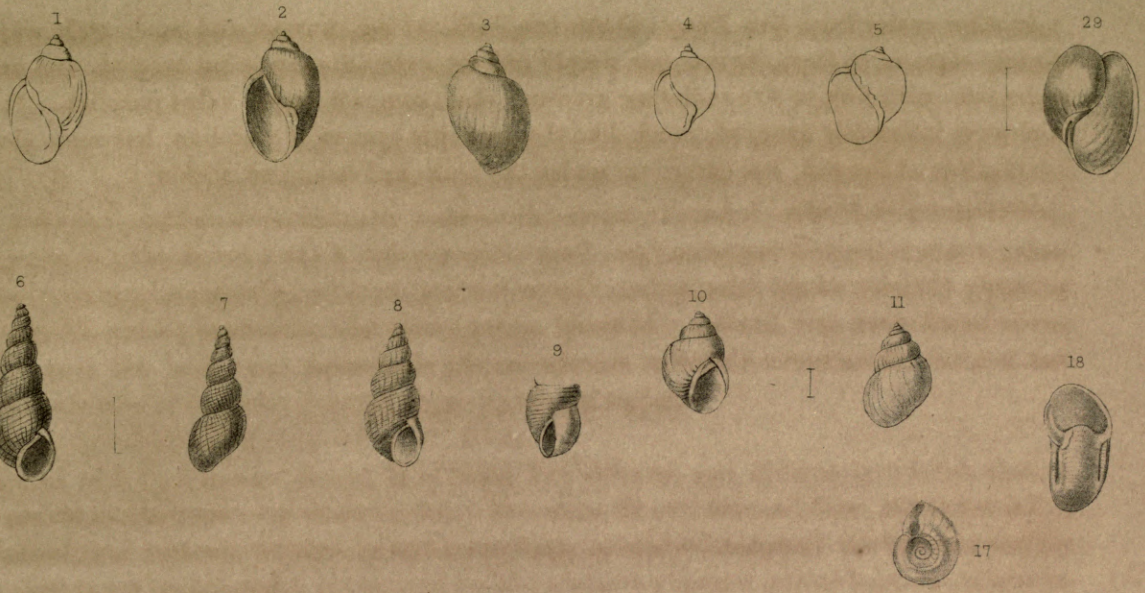
Locality.—San Francisco.

(2.) OSTREA.—A small parasitic *Oyster*, on twigs, probably of Gorgonia, usually projecting equally to either side. The form is elliptical, the under valve having a groove for the twig, with a corresponding eminence in the upper valve; sometimes it adheres by but one edge, and then assumes an oblique, alate form, like Avicula. It is quite thin, lineated, radiately ornamented with fasicles of brown lines.

Locality.—San Diego.

Another oyster from San Diego, about two inch s long, narrow and moderately widening, slightly sigmoid in form, its margins simple and th extremity somewhat truncate and undulate or dentate, with four or five radiating grooves; shell compact, upper valve purplish. It occurs in clusters intimately grouped, much like the parasitic oysters of Carolina, but more elongate, less digitate at the end, less cavernous under the beak, and less black within.

Locality.—San Diego.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INTRODUCTION.

THE following work was undertaken under many disadvantages. The writer did not accompany the Expedition, and, of course, had not an opportunity of observing specimens in their native localities, and in their natural relations. Circumstances relating to food, habits, uses, numbers, and grouping, and other important points which would impress themselves upon the mind of an observer, and by which the dry details of specific description might be greatly relieved, must, therefore, be wanting here.

Mr. Joseph P. Couthouy, the able naturalist of the Expedition in this department, made careful and suggestive notes of all interesting species, and, especially, of the new or doubtful species, with the intention of amplifying them after his return. To him they would have spoken volumes; but he alone could fully understand their import. Up to the time of leaving the Paumotu, or Low Coral Islands, these notes were pretty fully written out in form. On arriving at the Samoa Islands, his health obliged him to separate from the squadron; and the numerous notes he had subsequently made from day to day were left in an imperfect state. Still, these would have been extremely valuable, especially those relating to the land-shells of the Society, Samoa, and Sandwich Islands. But, unfortunately, repeated searches have failed to discover them among the masses of documents pertaining to the Expedition.

Mr. Couthouy was also careful to attach marks, or numbers, to all

specimens described or figured, or to which special interest attached; and they were so disposed of as to be easily accessible and readily recognised. The drawings relating to them had been so far finished as to secure the forms and attitudes, more particularly the colours of the animals, all of which greatly change after death, leaving the more permanent features to be copied at leisure. The identification of these shells was, therefore, very important. But it had been thought necessary, by the Navy Department, that the boxes sent home in advance of the Expedition should be opened, lest, by long packing, the specimens might be injured. Those who performed this service were not fully aware of the importance of replacing the specimens as originally arranged, and hence much labour and difficulty in identifying them. In many instances, the search was quite fruitless, and, consequently, many drawings and descriptions were altogether rejected, and so far lost.

Still an additional difficulty arose from residing at a long distance from Washington, where the collection is deposited, rendering it impossible to have such a frequent recourse to the specimens as would have greatly facilitated the settlement of questions which arose from day to day.

Notwithstanding the disadvantages under which this branch of Zoology laboured, an immense mass of specimens of shells was collected, and among them a very large number of new species,—larger, probably, than has ever been collected by any similar Expedition. Both before and after the separation of Mr. Couthouy, a very decided zeal, in the collection of shells, was manifested by both officers and men, as well as by the other members of the Scientific Corps. Among them must be especially mentioned, as the principal collectors:—Commander Charles Wilkes; Messrs. J. P. Couthouy, C. Pickering, J. D. Brackenridge, T. R. Peale, W. Rich, J. D. Dana, of the Scientific Corps; J. Drayton, Artist; Lieutenants C. Ringgold, A. L. Case, T. A. Budd, W. M. Walker, J. A. Underwood; Passed-Midshipmen W. May, W. Reynolds, H. Eld; Midshipmen G. W. Hammersley, and George Elliott, Jr.; Assistant-Surgeons J. L. Fox and J. S.

Whittle; W. Spieden, Purser; J. R. Howison, Captain's Clerk; F. Monserrat, Steward; C. Erskine, James Sheaf, S. Stearns, E. Verry, Seamen; J. W. W. Dyes, Taxidermist.

The Expedition was also indebted, for many specimens of rare and valuable shells, to Mr. Dimond, of the Sandwich Island Mission; Mrs. Richards, of the same Mission; and Mrs. Mitchill, of New South Wales.

With rare exceptions, the shells were collected on the sea-beach and coral reefs, very few opportunities having been afforded for obtaining specimens from deep water, by the dredge, on account of the incessant employment of the men and boats on special hydrographical duties.

Several zoological provinces not previously explored were examined, and furnished most interesting groups of specimens. Among them are the collections made at Tierra del Fuego; the land-shells of the Society and Samoa Islands, as well as other Pacific islands; and the marine shells of Oregon,—more especially those from Puget's Sound, every one of which appear to be new to collections.

In some genera the number of new species added is quite remarkable; for instance, the species added to the genus Succinea equal all those previously known. The genera Trochus, Perna, Avicula, and Mytilus have been greatly augmented. To the scanty list of naked mollusks previously known, additions of many new and beautiful forms have been made. The Cephalopods, especially, have received large accessions, which, for life-like colouring and delineation, have not been surpassed.

My instructions were, to name and describe the new species of shells found in the collection, following the system of Lamarck, and, also, to introduce the figures of such animals as had not hitherto been published, or had been but imperfectly delineated, with descriptions of their external features. The figures were all drawn from the living animal, so that they are true to life as to their form and colouring,—more so, indeed, than any that have yet been published. The mollusks of several genera of shells, hitherto unknown, are now, for the first time, delineated, and are important additions to malacology.

In drawing up the descriptions, I have endeavoured to use language as simple and definite as possible, and, by comparing each species with the one most nearly allied to it, to make its peculiar character apparent. Where a shell bore characters somewhat prominent, I have endeavoured to select a specific name significant of them, almost entirely avoiding local and complimentary appellations. I have retained names selected by Mr. Couthouy, unless they had been preoccupied; and, where his descriptions have mainly been used, his initials are appended; the revision of them, and the determination that they did not relate to shells already described, having been made by myself.

After the most scrupulous endeavours to avoid describing shells which had been previously named, consulting all the books and the best collections in the country, with this view, it is quite likely that the evil has not been entirely avoided. The history of a contemporaneous Voyage of Exploration in nearly the same track, has been in the course of publication simultaneously; and, from a recent examination of a few of the plates of the Voyage of the Astrolabe and Zelée, several species appear to be there figured, which are also described in this work. It is believed, however, that the descriptions published in the Proceedings of the Boston Society of Natural History were of prior date, and must, therefore, be adopted.

The formation of new genera from characters of the shell alone, has been avoided. In some few instances, where new forms of mollusks have been presented, such as could not be united with received genera without violence, a new genus has been instituted. In instances where generic divisions seemed justifiable, I have rested contented with indicating groups, without formally establishing them. In several cases it has been possible to present, for the first time, or essentially to correct, the characters of the mollusk, thus contributing something towards a natural classification.

In this collection of descriptions of new species, where so many genera do not appear at all, and very few are fairly represented, no accurate systematic arrangement could be expected, and none has been attempted.

It is much to be regretted, however, that the descriptions of animals were limited to their external characters, and that dissections and delineations of their anatomical structure had not also been directed; especially in the case of those genera in which the structure of the soft parts is still unknown. A very large supply of mollusks, in spirit, is preserved in the collection, and would afford ample materials for future zoological investigations concerning this class of animals.

As this work was intended to be purely descriptive, no generalizations were expected. A few points, however, have presented themselves so obviously, in examining the specimens and memoranda of the shell collection, that it would seem proper to advert to them.

The doctrine of distinct zoological regions evidently appertains to the mollusks, and is well illustrated by them. In nearly every work, containing any considerable catalogue of shells, the same species will be found quoted as being found in widely distant regions, in different oceans, and even on opposite sides of the globe. The many thousand localities carefully noted on the records of the Expedition, go to prove beyond dispute, that no such random or wide-spread distribution obtains. The error has arisen from two principal causes. One is, that reliable notes of localities have not been taken. A voyage is made to the Sandwich Islands, and all the shells brought home by the vessel are said to be shells from the Sandwich Islands, though they may have been obtained at California, the Society Islands, New Zealand, and, perhaps, half a dozen other places quite as remote from each other. A sea captain purchases a collection at Calcutta or Valparaiso, for his friends at home; and all the shells are marked as denizens of the port where they were purchased, though they might not have lived within thousands of miles. Purchased shells cannot be relied on for localities; for this end a shell must have been found containing the animal, or else dredged, or picked up on the shore, and labelled accordingly. There have been instances where New England shells, which had gone to the west coast of America, in the way of exchange, came back again as Pacific shells.

The second cause is, that shells are regarded as specifically iden-

tical, which, on careful comparison, are found not to be so. And this is very likely to occur, where some one very remarkable peculiarity exists. Thus, a Lutraria from Lower California (*L. undulata*), has the thin, milk-white, concentrically undulated valves, so similar to those which characterize a shell from the coast of Carolina (*L. canaliculata*), that no one observing them separately, would hesitate to pronounce them the same; but place the two side by side, and it will be seen that in one the beaks are near the posterior, and in the other near the anterior end of the shell. Equally striking resemblances and differences will be found when we compare Mactra nasuta and M. Brasiliana, Lutraria ventricosa and L. carinata, the former of which are found in the Gulf of California, and their analogues in the Gulf of Mexico. So too we find on the catalogues Cytherea chione and Natica maroccana, Mediterranean shells, set down as found also in the Gulf of California; but a direct comparison shows them to be quite different in form and coloration, and well entitled to the distinctive appellations of Cytherea biradiata and Natica Chemnitzii. Triton nodosum, of the West Indies, has also been regarded as identical with a Sandwich Island species (*T. elongatum*). We need not multiply examples of this kind. But if such confusion has arisen among strongly-marked species, how much more liable is it to occur where specific differences are slight. In many genera, as in Physa and Succinea, the form, surface, and colouring are so uniform throughout, that undoubted species are distinguished by only the slightest differences. Indeed, there are even some genera, like Helix and Nanina, Patella and Lottia, which cannot be distinguished but by an examination of the animal. When, therefore, we have before us shells from widely diverse regions, apparently identical, they should be subjected to the most careful scrutiny for structural differences. If no obvious ones are detected, we may not consider the question as settled, unless the animals have been compared; and we may go even further, and require that their internal structure, as well as external features, should be examined. The number of instances where this apparent ubiquity obtains is fast diminishing, as in the cases already mentioned, in those

of Cyprea exanthema, cervina and cervinetta, &c. A large proportion of the shells inhabiting the eastern and western shores of the Atlantic, have been regarded as identical; and many of them are really so. But the closer the comparison, the more it tends to diminish rather than increase the identical species. The same is found true in regard to other classes of animals. In fact, the doctrine of the local limitation of animals, even now, meets with so few apparent exceptions, that we admit it as an axiom in zoology, that species strongly resembling each other, derived from widely diverse localities, especially if a continent intervenes, and if no known or plausible means of communication can be assigned, *should be assumed as different, until their identity can be proved.* Much study of living specimens must be had before the apparent exceptions can be brought under the rule. Some shells undoubtedly have a very extensive range. The species of Cyprea are remarkable for this, and more than any other genus would lead us to conclude that oceans present no limitations. Even among them, however, new distinctions are constantly appearing. There are also some shells which may be called cosmopolite. At least they are erratic, and will be found wherever their pabulum is found. Thus, Helix cellaria, attaching itself to water-casks, is found in most seaports in all parts of the world. Helix similaris is found wherever the coffee-plant grows; and Helix vitrinoides in like manner accompanies the Arum esculentum or taro. Bulimus octona, or a closely allied species, is a parasite of the Banana. But exceptions of this kind confirm rather than militate against the conclusion.

There is a certain local aspect, a peculiar facies, which impresses itself upon us the more we study local collections; just as we learn, by a very little observation, to distinguish men of different nations and neighbourhoods. Thus we distinguish the loose, horny, colourless structure of the northern marine species; the stony, corroded, livid New Zealanders; the polished, absolutely perfect specimens from the coral seas. Certain forms are so characteristic of certain regions that we never expect to find them elsewhere. Thus, we look for Clausilia in Europe and Asia; for Achatina in Africa; for Cylindrella in the

West Indies and their neighbourhood; for Achatinella in the Sandwich Islands; for Partula in the Pacific Islands, south of the equator; to the United States of America we look for Helices with toothed apertures; to the Philippine Islands for the ivory and beautifully painted species, &c., and we venture to call them stragglers, if they are brought to us from any other quarter.

Dr. Pickering remarks, in relation to the Feejee Islands, "It was only here, in the midst of the Coral sea, where I found myself surrounded by a great variety of Cone, Mitre, Olive, Cowry, Ovula, Harpa, Terebra, Cassis, Strombus, Conælix, Pyramidella, Tridacne, Vulsella, Lima, &c., that I became fully aware of the imperfect state of this science. We missed Patella, Eburna, Terebellum, Cancellaria, Hippopus, Ancillaria, and Marginella. Bivalves seem to prevail less than at Tonga. Mactra proper was not met with. In fluviatile shells these islands are richer than the eastern ones, no doubt on account of their larger size and the consequent greater abundance of fresh water. A fresh-water bivalve, Cyrena, was here for the first time met with among the islands. Among land-shells we missed Partula. The appearance of large Bulimi reminded one of the continent." The true Helices seem to be supplanted by Nanina.

Another point of interest, extensively elucidated by the collections of the Expedition, is the occurrence of analogous species in co-ordinate regions. It is now a received fact that the animals and plants of the northernmost zones are, for the most part, identical throughout the whole circuit; and that the species gradually diverge from each other towards the equator, on the three continents; and that after passing the equator towards the south, there is not a return to the same species, and rarely to the same genera, as we should expect if variation of forms depended mainly on difference of temperature. There is, however, a return to mollusks of a kindred character and form, and oftentimes to the same genera.

The analogies of specimens from distant regions are much stronger when reckoned by isothermal longitude than by isothermal latitude. In the latter case we may have analogous genera. Along our northern

seas, some of the most characteristic shells are Buccinum, Tritonium, Fusus, Terebratula, Rimula, &c. Around Cape Horn are shells of the same types, so closely allied that they have not yet been separated as distinct genera, though peculiar in many important respects. But this resemblance does not descend to species. In the first case, however, not only have we the same genera, but the species seem to repeat each other: so that species brought from great distances east or west, are scarcely to be distinguished upon comparison. As examples in illustration, we may place against each other the following species from Oregon and from the Eastern States:

Mya præcisa,	Mya truncata.
Osteodesma bracteatum,	Osteodesma hyalina.
Cardita ventricosa,	Cardita borealis.
Cardium blandum,	Cardium Icelandicum.
Venus calcarea,	Venus mercenaria.
Alasmodonta falcata,	Alasmodonta arcuata.
Helix Vancouverensis,	Helix concava.
Helix loricata,	Helix inflecta.
Helix germana,	Helix fraterna.
Planorbis vermicularis,	Planorbis deflectus.
Planorbis opercularis,	Planorbis exacutus.
Lacuna carinata,	Lacuna vincta.
Natica Lewisii,	Natica heros.
Trichotropis cancellata,	Trichotropis borealis.
Fusus fidicula,	Fusus turricula.
Lottia pintadina,	Lottia testudinalis, &c.

Mingled with these are others very different in type, which mark the two localities as constituting very different zoological regions. Where, for instance, have we the analogues of Panopæa generosa, Lutraria ventricosa, Triton Oregonense, on the one hand, and of Mactra gigantea, Fusus decemcostatus and Icelandicus, Pyrula canaliculata and carica, Pandora trilineata, &c., on the other? The same comparison holds good between the shells of the Gulf of California and the Gulf of Mexico.

From a consideration of the land-shells collected on the Pacific islands, it seems possible to draw some fair inferences as to the relations of the lands which once occupied the area of the Pacific Ocean, and whose mountain peaks evidently now indicate, or constitute, the islands with which it is now studded. By observation of the species, we think there are strong indications that some groups of islands have an intimate relation to each other, and belonged, at least, to the peaks of the same mountain ranges, before they were submerged; while the indications are equally strong that other groups had no such territorial connexion.

The Samoa, Friendly, and Feejee Islands, are near to each other, and seem as if they must have intimate geological relations. The Samoa and Friendly Islands give evidence of such relation, the same forms and many of the same species occurring on both groups. But, if we may draw inferences from the land-shells, these two groups are more intimately related to the Society Islands, though at a much greater distance, than to the Feejee Islands. Not a single species of land-shell, found on the Feejees, was collected on either of the other groups. Several genera which are common to the other groups are wanting in the Feejees. Thus, no specimen of Succinea or Partula, genera so abundant in the Society and Samoa Islands, was found at the Feejees; and the true Helix, especially the pyramidal forms, so remarkable in the other groups, seemed to be replaced by large species of Nanina. On the other hand, large and peculiar species of Bulimus occur abundantly on the Feejees, while nothing of the kind occurs on any of the other islands. Indeed, judging from the land-shells, the Feejees are more nearly allied to the islands to the westward,—such as the New Hebrides, than to the Friendly Islands, on the east, though so much nearer. When we examine the fluviatile shells, however, we do not find the same distinction. Many of the same species of Melania, Navicella, and Neritina, seem to occur in all the groups, though the large coronated species of Melania prevail in the Feejees. There is some reason to suspect, moreover, that the fresh-water shells collected at these islands have accidentally become more

or less mingled. It must also be considered, that the Navicella, and more especially Neritina, is oftentimes decidedly littoral, and even marine, in its habits.

The little island of Metia, or Aurora Island, to the northeastward of Taheiti, is one of peculiar interest. It is a coral island, which has been elevated 250 feet, or more, and has no other high island anywhere near it. On it were found four small land-shells belonging to three genera, viz. :—Helix pertenuis, Helix dædalea, Partula pusilla, and Helicina trochlea. None of these were found upon any other island. They seem to have originated there, after the elevation of the island, and have a significant bearing upon the question of local and periodical creations in comparatively modern times.

As the genus Partula is characteristic of the groups just south of the equator, so Achatinella is the characteristic shell of the Sandwich Islands. Closely connected as the islands of this group are, they each have their peculiar forms of land-shells ; and, as the southern islands bear evidence of greater age than the northern ones, we may infer that, within these narrow limits, we have evidence of the appearance of some species subsequent to the existence of others now living. On the Island of Kauai, the oldest of the group, we have Achatina adusta and pyramidata, a form which does not appear on the other islands ; the Achatinellæ are chiefly of the elongated glabrous form, which I have grouped under the name Leptachatina ; the Helices are planorboid and multispiral. On Molokai, the species of Achatinella are large and beautiful, and peculiar in their form and colouring. On Maui, the Helices are small and glabrous, with some very curious hispid and ribbed species, with lamellæ within the aperture. On Oahu, the species of both Helix and Achatinella are similar to those on Maui. On Hawaii, Succinea seems to prevail in larger proportion than on the other islands, while Achatinella, which occurs so abundantly on all the other islands, either does not occur at all, or but very rarely.

Boston, December, 1851.

DESCRIPTION

OF SOME

NEW FOSSIL SHELLS,

FROM THE

TERTIARY OF PETERSBURG, VA.

Read before the American Philosophical Society, May 29, 1843.

BY

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PHILADELPHIA:
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ARTICLE IX.

Description of some new Fossil Shells, from the Tertiary of Petersburg, Virginia. By Henry C. Lea, Philadelphia. Read May 29, 1843.

In the United States, the various Supercretaceous, or Tertiary, formations, are widely extended and beautifully developed. They have been traced from the St. Lawrence to the Gulf of Mexico, and from the Atlantic far into the western territory. For the sake of convenience, geologists have divided them into two groups, according to their geographical position, namely, the Atlantic and the Western Tertiary. Of the latter it is not, at present, my intention to speak,—but little, comparatively, is known of it, and it presents a rich field to any enterprising geologist who may undertake its investigation.

The northern extremity of the Atlantic Tertiary, as far as it has been discovered, is on the St. Lawrence and around Lake Champlain. From thence to Maryland, its course may be traced by a few small patches in New Jersey, and, from Maryland to the Gulf of Mexico, it exists in a broad sheet.

It is to be expected that, extending as it does over so wide a space, it should present very different characters in different localities. Accordingly, we find that much confusion has existed in its classification. Mr. McClure, the first who attempted to systematize American geology, considered it all as alluvial, but subsequent geologists soon corrected this error. Mr. Conrad, in the first number of his "Fossil Shells of the Tertiary of North America," divided it into the Upper Marine, Middle Tertiary, and Lower Tertiary. In this arrangement, the Upper Marine corresponds very nearly with Mr. Lyell's Pliocene, the Middle Tertiary comprises the Miocene and Eocene of the same author, and the Lower Tertiary consists of sand and gravel containing Lignite and a few shells. Mr. Conrad has, more recently, adopted the classification of Lyell, which is perhaps best, as the beds comprising his Lower Tertiary are hardly of sufficient importance to constitute a separate formation.

The latest, and probably, most correct views upon this subject are, however, those which Mr. Conrad advances in the second number of the Bulletin of the National Institution. He there supposes that we possess the Eocene, Miocene, and Post-Pliocene, as nearly as the parallel can be drawn between our strata and those of Europe. Several links of the chain, however, appear to be wanting, as but one or two species are common to the Eocene and Miocene, and only recent shells have been found existing in both the Miocene and Post-Pliocene. The Eocene does not possess a single

species at present existing; in the Miocene the proportion is small; while, in the Post-Pliocene all are recent. According to Mr. Conrad, the per centage of still existing shells in the Miocene is about seventeen, but I am inclined to think that it will prove, on further investigation, to be smaller. It, however, cannot be relied on as a certain criterion, being extremely variable in different localities. Petersburg, Virginia, may be taken as an instance of one extreme: the following is a list of the fossils which have been found there, exclusive of those herein described.

Dentalium thallus,	. .	Con.	Venus Rileyi,	. . . .	Con.	Fissurella redimicula,	. Say.
" attenuatum,	. .	Say.	" difformis,	. . .	Say.	Crepidula fornicata,	. . "
Serpula granifera,	. .	"	Cardium sub-lineatum,	. .	Con.	" costata,	. . Morton.
Balanus sp.?			" laqueatum,	. .	"	Dispotæa ramosa,	. . Con.
Pholas ovalis,	. . .	Say.	Cardita granulata,	. . .	Say.	Natica duplicata,	. . Say.
Panopæa reflexa,	. .	"	Cypricardia arata,	. . .	"	" heros?	. . . "
Mactra congesta,	. .	Con.	Arca centenaria,	. . . .	"	Acteon Wetherilli,	. . Lea.
Crassatella undulata,	.	Say.	" idonea,	. . . . .	"	Rotella nana,	. . . "
" melina,	. .	Con.	" incile,	. . . . .	"	Trochus philanthropus,	Con.
Corbula cuneata,	. . .	Say.	Pectunculus subovatus,	. .	"	Turritella variabilis,	. "
" inæqualis,	. .	"	" quinquerugatus,		Con.	" indenta,	. . "
Tellina æquistriata,	. .	"	" pulvinatus,*	.	Lamk.	" plebeia,	. . Say.
Lucina speciosa,	. .	"	Nucula lævis,	. . . .	Say.	Pleurotoma pyrenoides,	Con.
" contracta,	. .	"	" obliqua,	. . . .	"	Fasciolaria mutabilis,	. "
" edentula,	. .	"	Chama congregata,	. . .	Con.	Pyrula carica,	. . . Say.
" divaricata,	. .	Lamk.	" corticosa,	. . .	"	" canaliculata,	. "
Astarte undulata,	. .	Say.	Pecten eboreus,	. . . .	"	Fusus cinereus,	. . . "
" arata,	. . .	Con.	" Madisonius,	. .	Say.	" exilis,	. . . . Con.
" concentrica,	.	"	Plicatula marginata,	. .	"	Murex quadricostatus,	. Say.
Clathrodon Grayi,	. .	"	Perna torta,	. . . . .	"	Buccinum laqueatum,	. Con.
Cytherea reposta,	. .	"	Ostrea Virginiana? var.	.	Gmel.	" porcinum,	. "
" convexa,	. .	Say.	Capulus lugubris,	. . .	Con.	Marginella perpusilla,	. "
Artemis acetabulum,	.	Con.				" limatula,	. "

We have here sixty-eight species, in addition to one hundred and five which I shall describe in this paper, and which I consider as hitherto unknown, or in all, one hundred and seventy-three. Now, of these, but nine can be identified with existing shells, namely,

Lucina divaricata,	Crepidula fornicata,	Pyrula carica,
Artemis acetabulum,	Natica heros?	" canaliculata,
Ostrea Virginiana?	" duplicata,	Fusus cinereus.

and of these, two appear to me doubtful, namely, Natica heros, and Ostrea Virginiana. Considering them, however, as the recent species, this gives us about five per cent. of still existing shells. It appears almost absurd to compare this with the Miocene of Dax, the best characterized in Europe, which, by the tables of Dr. Grateloup, con-

* In the first number of the "Fossil Shells of the Tertiary of North America," Mr. Conrad has described and figured a shell as the Pect. pulvinatus, Lam. But, after comparing it with a number of specimens of that species, and with Deshayes' figures, I am forced to consider it as specifically distinct. I, therefore, propose to name it P. ELEPHANTOPUS.

tains between thirty and forty per cent. of recent shells. Yet the Miocene of Petersburg has not a single species which can be identified with any of the Claiborne Eocene fossils, while it abounds in shells which are found, at other localities, in company with more than twenty per cent. of recent species. These few facts will sufficiently exemplify the fallacy of attempting to classify our Tertiary by the rules which regulate that of Europe.

It may, perhaps, be deemed not irrelevant to this subject, to introduce here the following table of the number of the species in each genus, hitherto described from the Tertiary of the United States. Unfortunately great confusion exists in their synonymy, and he who would review the descriptions of them, with an impartial and unsparing hand, would confer a great benefit on all interested in American geology. To this part of the subject, I have not pretended to pay any attention, and therefore the number of species is, in reality, smaller than that given here, many of them being repeated under the same or different genera. I, however, have not felt inclined, at present, to undertake the Augean task of clearing away the synonymes, but I hope that, as far as I pretend to go, I shall be found correct; that is, as far as the mere numbers are concerned.*

List of the Fossil Shells found in the Tertiary Beds of the United States.

Genera.	No. of species.
Acteon,	23
Aligena,	2
Amphidesma,	12
Anatina,	3
Ancillaria,	7
Anolax,	2
Anomia,	1
Arca,	14
Artemis,	2
Astarte,	20
Avicula,	4
Balanus,	4
Bissomya,	1
Bonellia,	2
Buccinum,	20
Bulla,	5
Bullina,	1
Calyptrea,	4
Cancellaria,	17
Capulus,	1
Cardita,	6
Cardium,	7
Cassis,	1
Cemoria,	1
Cerithium,	10
Chama,	3
Chiton,	1
Conus,	5
Corbis,	3
Corbula,	11
Crassatella,	8
Crepidula,	12
Cryptostoma,	1
Cucullæa,	4
Cypræa,	1
Cumingia,	1
Cypricardia,	1
Cyrena,	1
Cytherea,	26
Delphinula,	12
Dentalium,	5
Diplodonta,	1
Dispotæa,	6
Donax,	1
Egeria,	10
Emarginula,	1
Erycina,	2
Fasciolaria,	5
Fissurella,	7
Fistulana,	1
Fulgur,	7
Fusus,	51
Gastrochæna,	1
Gnathodon,	3
Grateloupia,	1
Gryphæa,	1
Hiatella,	1
Hippagus,	1
Hipponix,	1
Infundibulum,	6
Isocardia,	2
Lepton?	1
Lima,	2
Littorina,	1
Lucina,	27
Lutraria,	2
Mactra,	18

* I regret that I have not been able to obtain the names of the species figured by M. Lesueur from the Eocene of Walnut Hill, Mississippi. I have seen the plates, but I do not know whether the descriptions were ever published. It may be seen that I have included in this catalogue the species described in the following pages.

Genera.	No. of species.
Marginella,	16
Melongena,	3
Mitra,	13
Modiola,	2
Monodonta,	1
Monoceros,	5
Monoptygma,	2
Murex,	6
Mya,	3
Myoparo,	1
Mysia,	2
Mytilus,	2
Nassa,	5
Natica,	23
Nautilus,	1
Nucula,	31
Nummulites,	1
Oliva,	16
Orbicula,	1
Orbis,	1
Ostrea,	18
Pandora,	2
Panopæa,	4
Pasithea,	21
Patella,	1
Pecten,	22
Pectunculus,	22
Perna,	2
Petaloconchus,	1
Petricola,	3
Pholadomya,	2
Pholas,	5
Placuna,	1
Plagiostoma,	1
Planaria,	1
Pleurotoma,	32
Plicatula,	4
Proto,	1
Psammobia,	2
Psammocola,	2
Pyramidella,	3
Pyrula,	7
Ranella,	1
Rostellaria,	4
Rotella,	5
Saxicava,	2
Sanguinolaria,	2
Scalaria,	16
Serpula,	5
Sigaretus,	5
Siliquaria,	2
Solarium,	18
Solen,	2
Solecurtis,	2
Spirorbis,	1
Stalagmium,	1
Strigilla,	1
Tellina,	9
Terebra,	8
Teredo,	4
Thracia,	1
Triton,	1
Trochus,	16
Tuba,	3
Turbinella,	5
Turritella,	20
Typhis,	2
Venericardia,	7
Venerupis,	1
Venus,	11
Vermetus,	1
Voluta,	12
Volvaria,	1

It is to the kindness of Mr. Tuomey, of Petersburg, that I owe the following shells, as well as those in the list a few pages back. Most of the smaller species herein described, I met with by carefully examining the sand scraped from the cavities of larger shells, as well as a small portion of the marl of the vicinity, with which Mr. Tuomey was kind enough to favor me. I mention this merely to show the importance of thoroughly searching the strata of the various localities before we conclude that we have all the species existing there. Attracted by the beauty of the larger shells, conchologists have very much neglected the more minute ones, which require a closer examination, and thus our knowledge of our fossil conchology is still limited. I may as well observe here, that I found the species met with in the sand from the cavities of the larger shells, in general, different from those in the loose marl. It is difficult to give a reason for this, unless there were species which usually inhabited the interior of dead shells, like the recent Valvata tricarinata, Say.

In looking over these shells, I have been struck with the general resemblance which obtains between them and those of a corresponding age from Dax. This is peculiarly observable in the genera Acteon, Pasithea, &c. which are very numerous in both localities. Their connexion is so close that in some cases they are scarce specifically distinct.

FAMILY SERPULIDÆ.

GENUS SERPULA.

S. CONVOLUTA, PL. 34. FIG. 1.

S. testâ in spiram discoidalem contortâ, tenui, plerumque cancellatâ, apud apicem regulariter volutâ; aperturâ rotundâ.
Shell twisted into a discoidal spire, thin, usually cancellate, regularly whorled near the apex; mouth round.

Diam. .10 of an inch.

Remarks.—This shell is generally twisted into a regular disc. The sculpture is very variable, sometimes seeming like longitudinal moniliferous costæ, and, at others, regularly cancellate. The apex is singularly formed, being smooth and perfectly voluted, like a young Turbo. This is, I suppose, the form it has when excluded from the egg.

S. ANGUINA, PL. 34. FIG. 2.

S. testâ minimâ, irregulariter contortâ, striatâ, crassâ; striis irregularibus transversis; aperturâ rotundâ.
Shell very small, irregularly twisted, striate, thick; striæ irregular, transverse; mouth round.

Diam. .04 of an inch.

Remarks.—This is a very minute species, and is, I believe, the only one of our fossil Serpulæ that has no longitudinal lines on the surface. This character will readily distinguish it from others. The apex has the same voluted character as the last, although not as well developed.

GENUS PETALOCONCHUS,* (NOBIS.)

Testa tubularis, solida, irregulariter contorta, laminis longitudinalibus duabus internis.
Shell tubular, solid, irregularly twisted, with two internal longitudinal plates.

Remarks.—The singular shell, on which I propose to found the above genus, differs from all the known tubular shells that I have met with, in the two internal longitudinal plates. It may possibly belong to the family Scalaridæ, and, if so, presents a link between them and the Plicacidæ.

P. SCULPTURATUS, PL. 34. FIG. 3.

P. testâ vel contortâ vel turritâ, crassâ, costulis longitudinalibus noduliferis; laminis internis politis, lævibus, ad aperturam obsoletis; aperturâ rotundâ.
Shell sometimes twisted, sometimes turrited, thick, with small longitudinal noduliferous ribs; internal laminæ smooth, polished, obsolete at the mouth; mouth round.

Diam. .20 of an inch.

Remarks.—The longitudinal costæ are generally nodulous, but they occasionally seem rather to be cancellated by transverse sulci, which, in other specimens, appear to usurp their place. The two internal laminæ are placed at about one-sixth of the circumference apart. They are generally directed towards the centre, and sometimes nearly meet. In some specimens they are much smaller than in others. They rarely or never seem to be continued to the aperture.

This is a very variable shell, both as to the sculpture and internal plates. I at first

* A πέταλον, lamina, et κόγχος, concha.

thought that there were two or three distinct species, but the varieties glide imperceptibly into each other. It appears to be by no means an uncommon shell at Petersburg.

The form figured is a very usual one. I have but few specimens which do not exhibit a decided tendency to form regular revolutions, and in some, the axis is so straight that a pin may be thrust through the umbilicus from the apex to the base.

The second figure is a specimen fractured to exhibit the appearance of the laminæ.

FAMILY TUBICOLIDÆ.

GENUS TEREDO.

T. CALAMUS, Pl. 34. Fig. 4.

T. testâ incognitâ; tubo parvo, rotundo, tenui, rugoso, striis irregularibus transversis.

Shell unknown; tube small, round, thin, rugose, with irregular transverse striæ.

Diam. .08 of an inch.

Remarks.—I found several specimens of this little species of Teredo, on breaking open a mass of Madrepore which they had pierced. It differs from the following shell, principally, in being much smaller, thinner, and more rugose.

T. FISTULA, Pl. 34. Fig. 5.

T. testâ incognitâ; tubo rotundo, tereti, crassissimo, tum recto tum curvato; striis irregularibus transversis raris.

Shell unknown; tube round, terete, very thick, sometimes straight and sometimes curved; with a few irregular transverse striæ.

Diam. .50 of an inch.

Remarks.—The transverse lines of growth vary exceedingly both in size and direction. The substance of the shell is very thick, the outer diameter being frequently .50, while that of the aperture is about .28 of an inch. I have them, however, even thicker.

GENUS GASTROCHÆNA.

G. LIGULA, Pl. 34. Fig. 6.

G. tubo incognito; testâ transversâ, oblanceolatâ, valdè inæquilaterali, posticè rotundatâ, anticè acuminatâ, inflatâ, concentricè striatâ; striis parvis, irregularibus; anticè hiatu maximo, valdè obliquo; margine basali tortuoso; margine dorsali recto; margine antico brevissimo; natibus sub-prominulis.

Tube unknown; shell transverse, oblanceolate, very inequilateral, rounded posteriorly, acuminate anteriorly, inflated, concentrically striate; striæ small, irregular; anteriorly gaping widely and very obliquely; basal margin tortuose; dorsal margin straight; anterior margin very short; beaks somewhat prominent.

Diam. .15 of an inch. Length .28. Breadth .12.

Remarks.—The opening at the anterior extremity commences near the dorsal margin, and extends to about the middle of the base. The beaks are placed very near the anterior end of the shell. As in most Gastrochænæ, there is a small interior cuneiform process immediately under them.

In procuring several specimens of this shell from a piece of madrepore which they had pierced, I unfortunately broke the tubes, and am therefore unable to describe them.

This species is not unlike the G. truncata, Sowerby, a recent shell from Panama, but may be distinguished by its smaller size, rounded extremity, and longer opening. It is,

I believe, the first species of the genus as yet discovered in a fossil state in this country. Mr. Conrad mentions having found the Fistulana elongata, Lam. at Claiborne, but, upon comparison with M. Deshayes' figure of that shell, I do not think that it can be identical with the present species. It is larger, more twisted, and has a different sculpture on the anterior part.

The genus Gastrochæna, as formed by Lamarck, was placed among the Pholadidæ, and considered to have no tube. M. Deshayes, however, includes it in the genus Fistulana, as it inhabits a tube and has no teeth. Mr. Sowerby, again, considers as Gastrochænæ those species which have a bent tube and an oval shell. According to this arrangement, the present species would, most probably, come under this genus, and as such I have placed it.

There are two Gastrochænæ among the fossils of Great Britain, one from the Oolite, the other from the London Clay. Deshayes describes five from the Paris Basin.

FAMILY PHOLADIDÆ.

GENUS PHOLAS.

P. RHOMBOIDEA, PL. 34. FIG. 7.

P. testâ transversâ, obliquè rhomboideâ, valdè inæquilaterali, posticè rotundato-angulatâ, anticè rostratâ, inflatâ, tenui, medio divisâ lineâ impressâ; areâ posticâ striis lævibus concentricis; areâ anticâ striis acutis flexuosis concentricis; margine basali curto; margine dorsali recto, valdè reflexo; palmulâ parvâ, recurvâ, tenui; lineis internis duabus elevatis longitudinalibus.

Shell transverse, obliquely rhomboidal, very inequilateral, rounded-angular posteriorly, rostrate anteriorly, inflated, thin, divided in the middle by an impressed line; posterior area with smooth concentric striæ; anterior area with acute, flexuose, concentric striæ; basal margin short; dorsal margin straight, very much reflected; palmule small, recurved, thin; two longitudinal internal, elevated lines.

Diam. .20 of an inch. Length .28. Breadth .18.

Remarks.—The striæ on the anterior part of the shell are sometimes wrinkled so regularly that they give it the appearance of being cancellate, although there are no radiating lines. The posterior part of the shell is nearly smooth, from the dividing line to the umbonial slope, where there are numerous regular lines of growth. There is a kind of second dentiform process, immediately below the beaks, formed by the recurving of the upper termination of the posterior margin. The two internal striæ extend from the beaks to the base. The posterior one is situated immediately under the umbonial slope. The anterior one is caused by the impressed dividing line. It extends, in a point, a little beyond the basal margin.

This shell is very similar to a specimen of the P. ovalis, Say, without the tube, and with the thin anterior basal portion removed, but I believe it to be a perfect shell, as I obtained it myself from the hole which it had formed, and in which it appeared to have remained undisturbed. It was surrounded by a little indurated mud which preserved it entire. It seemed to be entirely destitute of a tube, which character separates it from the P. ovalis. It also differs in the shape and size of the palmule, and in the two internal lines.

FAMILY SOLENIDÆ.

GENUS SOLEN.

S. MAGNODENTATUS, Pl. 34. Fig. 8.

S. testâ anticè truncatâ, et valdè hiante, lævi, politâ, crassâ; natibus compressis; dente laterali uno; dente cardinali uno, longo, acuto.

Shell truncate, and gaping very much anteriorly, smooth, polished, thick; beaks compressed; with one lateral, and one long, acute, cardinal tooth.

Diam.— . Length— . Breadth— .

Remarks.—Although I possess but a small fragment of this shell, yet it differs so essentially in the teeth from all of our Solenes, that I have no hesitation in pronouncing it distinct. I believe that it is the only extinct fossil species as yet found in our Tertiary.

GENUS PANOPÆA.

P. DUBIA, Pl. 34. Fig. 9.

P. testâ quadrato-elliptică, transversâ, inæquilaterali, posticè truncatâ, anticè rotundatâ, sub-inflatâ, crassiusculâ, striatâ; striis concentricis, regularibus; margine basali recto; margine dorsali recto; nymphis magnis, exsertis, longissimis; cardine cochleâ parvâ.

Shell quadrately elliptical, transverse, inequilateral, posteriorly truncate, anteriorly rounded, somewhat inflated, rather thick, striate; striæ concentric, regular; basal margin straight; dorsal margin straight; beaks prominent; nymphæ large, exserted, very long; hinge with a small fosset.

Diam. .10 of an inch. Length .08. Breadth— .

Remarks.—The nymphæ are unusually large, much exserted, and very long, extending the whole length of the dorsal margin. Near the beak, they are suddenly depressed and twisted round, and terminate in a small, shallow, internal fosset, or spoon-shaped tooth.

It is not without some hesitation that I have placed this shell among the Panopææ, as it has a spoon-shaped tooth in place of an erect, pointed one, but there is no genus to which it can be said positively to belong, and I do not consider its peculiar characters sufficient to authorize the erection of a new one for its reception. It seems to connect the Glycymeris with the Anatina, having the nymphæ of the one, and the spoon-shaped tooth of the other.

FAMILY MYIDÆ.

GENUS MYA.

M. REFLEXA, Pl. 34. Fig. 10.

M. testâ quadrilaterali, sub-inæquilaterali, posticè rotundatâ, anticè truncatâ et valdè apertâ, inflatâ, striatâ; striis concentricis, irregularibus; clivo umboniali elevato, rotundato; margine basali curvato; margine dorsali arcuato; natibus prominentibus, incurvis.

Shell quadrilateral, somewhat inequilateral, rounded posteriorly, truncate and very open anteriorly, inflated, striate; striæ concentric, irregular; umbonial slope elevated, rounded; basal margin curved; dorsal margin arcuate; beaks prominent, incurved.

Diam. .18 of an inch. Length .22. Breadth .29.

Remarks.—The opening at the anterior portion of the shell is remarkably large, and the margin there appears to be somewhat reflected. The striæ are more numerous and better characterized at the extremities, than in the central portion of the shell.

As but one valve of this shell, and that the left one, is before me, I cannot determine the shape of the tooth. The pit to receive it is small and almost horizontal.

This is, I believe, the only extinct species of Mya as yet found in our Tertiary.

GENUS THRACIA, (Leach.)

T. transversa, Pl. 34. Fig. 11.

T. testâ sub-ellipticâ, valdè inæquilaterali, posticè acuminato-rotundatâ, anticè truncatâ, sub-compressâ, tenui, medio lævi, posticè et anticè concentricè striatâ; clivo umboniali rotundato; margine basali curvato; margine dorsali medio angulato, posticè convexo, anticè concavo; natibus sub-acutis; callo nymphali parvo, obliquo.

Shell sub-elliptical, very inequilateral, acuminately rounded posteriorly, truncate anteriorly, sub-compressed, thin, smooth centrally, striate posteriorly and anteriorly; umbonial slope rounded; basal margin curved; dorsal margin angular in the middle, posteriorly convex, anteriorly concave; beaks somewhat acute; nymphal callosity small, oblique.

Diam. .10. Length .18. Breadth .28 of an inch.

Remarks.—From the shape of the anterior margin, I conclude that the shell must have gaped considerably there, but as I have no pair of valves, I cannot be certain. The sinus of the palleal impression is deep, and near the anterior cicatrix. In this character, it differs from the rest of the genus.

This is, I believe, the first Thracia found in our Tertiary deposites. Deshayes, in his tables, gives four as the number of European Tertiary species. The present one is the smallest of the genus.

GENUS ANATINA.

A. tellinoides, Pl. 34. Fig. 12.

A. testâ ovato-triangulari, transversâ, posticè angulatâ, anticè rotundatâ, compressâ, posticè undulatâ, tenui, concentricè striatâ; striis crebris minutis; margine basali sub-flexuoso; natibus compressis, prominentibus; dentibus lateralibus magnis; cochleâ obliquâ, ovato-acuminatâ, minimè profundâ; cicatricibus magnis.

Shell ovate-triangular, transverse, angular posteriorly, rounded anteriorly, compressed, posteriorly undulate, thin, concentrically striate; striæ numerous, minute; basal margin slightly flexuose; beaks compressed, prominent; lateral teeth large; fosset oblique, ovate-acuminate, shallow; cicatrices large.

Diam. .25. Length .45. Breadth —— of an inch.

Remarks.—Of the lateral teeth, the posterior one is much the longer. The fosset is small, quite oblique, acute above and rounded below. The broad undulation on the posterior part of the shell gives it very much the appearance of a Tellina, when viewed externally. The lines of growth are small, very numerous and irregular.

This species is quite thin and fragile. Out of some half a dozen specimens, I have but one perfect valve, and that is a very young one. I am therefore unable to give all the dimensions.

Judging from description, this shell is not unlike the A. antiqua, Conrad, but the difference in size and sculpture, and the posterior undulation distinguish them at once.

FAMILY MACTRIDÆ.

GENUS ALIGENA, (Nobis.)

Testa æquivalvis? subæquilateralis, posticè et anticè clausa; cardo dente cardinali uno, sulco sub natibus longo, minimè profundo.

Shell equivalve? sub-equilateral, closed posteriorly and anteriorly; hinge with one cardinal tooth, and a long shallow sulcation under the beaks.

Remarks.—The cardinal tooth is, in general, rather small. The sulcus appears to have received the ligament. It commences at the beak, and runs obliquely past the dorsal margin into the cavity under the beak. As I possess only odd valves of both the following species, I am unable to determine whether the shell is equivalve or not.

I have in vain endeavoured to find some genus, already described, which might receive these little shells, but their peculiar characters in having one cardinal tooth, and a ligamentiferous sulcation, descending into the shell, distinguish them from other genera. Their place in the systems is, most probably, in the family Mactridæ, between Erycina and Ungulina.

I have called the genus, Aligena, one of the surnames of Venus, from its resemblance to Erycina, also an appellation of that goddess.

A. striata, Pl. 34. Fig. 13.

A. testâ transversâ, sub-ellipticâ, posticè et anticè rotundatâ, inflatâ, tenui, striatâ; striis concentricis, propè marginem basalem maximis; clivo umboniali elevato, sub-angulato; margine basali curvato; margine dorsali medio angulato, posticè et anticè curvato; natibus prominentibus, incurvis, sub-lævibus; dente cardinali minimo; sulco longo, pene transverso; margine interno integro.

Shell transverse, sub-elliptical, rounded anteriorly and posteriorly, inflated, thin, striate; striæ concentric, very large near the basal margin; umbonial slope elevated, somewhat angulate; basal margin curved; dorsal margin angular in the middle, curved posteriorly and anteriorly; beaks prominent, incurved, nearly smooth; cardinal tooth very small; sulcation long, nearly transverse; margin entire within.

Diam. .10. Length .19. Breadth .21 of an inch.

Remarks.—The concentric striæ are irregular in size and number, but there is a general increase from the beaks to the base. Those near the base, indeed, almost merit the name of costæ. The cardinal tooth is extremely small.

A. lævis, Pl. 34. Fig. 14.

A. testâ transversâ, sub-quadrilaterali, posticè rotundatâ, anticè subtruncatâ, convexâ, inflatâ, lævi; margine basali recto; margine dorsali medio angulato, posticè et anticè curvato; natibus sub-prominulis, incurvis; dente cardinali longo; sulco lato, curto, penè transverso; margine interno integro.

Shell transverse, sub-quadrilateral, posteriorly rounded, anteriorly sub-truncate, convex, inflated, smooth; basal margin straight, dorsal margin angular in the middle, curved anteriorly and posteriorly; beaks somewhat prominent, incurved; cardinal tooth long; sulcation wide, short, nearly transverse; margin entire within.

Diam. .14. Length .18. Breadth .22 of an inch.

Remarks.—There are a few, almost imperceptible lines of growth over the surface of the shell, which, under a powerful microscope, give it a somewhat roughened appearance. The cardinal tooth is very long, and the sulcus is shallow, so that the hinge, at first glance, is not unlike that of the genus Thracia.

This shell is closely allied to the preceding, but the differences in outline, hinge and sculpture separate them.

FAMILY LITHOPHAGIDÆ.

GENUS PETRICOLA.

P. COMPRESSA, PL. 34. FIG. 15.

P. testâ valdè transversâ, valdè inæquilaterali, sub-ellipticâ, compressâ, posticè sub-truncatâ, anticè rotundatâ, tenui, striatâ posticè et anticè; striis minimis, concentricis; margine basali recto; margine dorsali recto; natibus sub-acutis, prominentibus; dentibus duobus, parvis, divergentibus.

Shell very transverse, very inequilateral, sub-elliptical, compressed, posteriorly sub-truncate, anteriorly rounded, thin, striate posteriorly and anteriorly; striæ very small, concentric; basal margin straight; dorsal margin straight; beaks somewhat acute, prominent; teeth two, small, divergent.

Diam. .10. Length .12. Breadth .25 of an inch.

Remarks.—The concentric lines of growth are very small. They are visible on the anterior and posterior portions of the shell. On the central part they are obsolete, leaving it smooth. The teeth are small and unusually divergent for a Petricola.

This shell is smaller and more compressed than any of our described species. In form it much resembles Saxicava vaginoides, Desh., but it is more transverse and differs in the hinge.

FAMILY NYMPHIDÆ.

GENUS PSAMMOCOLA, (BLAINVILLE.)

P. LUCINOIDES, PL. 34. FIG. 16.

P. testâ sub-orbiculari, pene æquilaterali, posticè et anticè rotundatâ, convexâ, tenui, striatâ; striis concentricis, minimis; natibus prominentibus, sub-rectis; valvâ sinistrâ dentibus duobus cardinalibus, quorum unus bifidus, lateralibus nullis.

Shell suborbicular, almost equilateral, rounded anteriorly and posteriorly, convex, thin, striate; striæ concentric, very small; beaks prominent, nearly straight; left valve with two cardinal teeth, one of which is bifid, and no lateral ones.

Diam. .15. Length .31. Breadth .35 of an inch.

Remarks.—This shell is unusually lenticular for a Psammocola. The concentric striæ are numerous and extremely small. There are, however, three or four larger ones, nearly equidistant, over the surface of the shell.

The general resemblance which this shell bears to some species of the genus Lucina, will readily distinguish it from its congeners.

I have adopted this genus on the authority of Sowerby, who says that in it Blainville unites the Psammobia and Psammotæa of Lamarck, considering the difference between these genera as artificial and accidental.

P. REGIA, PL. 34. FIG. 17.

P. testâ transversâ, ovato-quadratâ, inæquilaterali, posticè hiante, anticè et posticè subtruncatâ, valdè inflatâ, crassissimâ, sulcatâ; sulcis radiantibus, crebris, æqualibus, latis; margine basali penè recto; margine dorsali sub-cur-

vato; natibus valdè elevatis, acuminatis; in valvâ utrâque dentibus cardinalibus duobus, lateralibus nullis; nymphis curtis, crassis; lunulâ parvâ, cordatâ; cicatricibus maximis; cicatrice palleali valdè sinuato.

Shell transverse, ovately quadrate, inequilateral, gaping posteriorly, subtruncate anteriorly and posteriorly, very much inflated, very thick, sulcate; sulci radiating, numerous, equal, wide; basal margin almost straight; dorsal margin slightly curved; beaks much elevated, acuminate; hinge in each valve with two cardinal and no lateral teeth; nymphæ short, thick; lunule small, cordate; cicatrices very large; palleal impression much sinuated.

Diam. 1.25. Length 1.56. Breadth 2.30 inches.

Remarks.—The radiating sulci are largest and deepest on the posterior extremity of the shell; they are interrupted by occasional lines of growth. The palleal impression becomes very broad as it approaches the anterior cicatrix. It is very rugose, and has a large, semi-elliptical sinus posteriorly. In the right valve, one of the teeth is bifid, but, as in all my specimens the hinge of the left valve is fractured, I am unable to say whether this be the case in it or not. The outline of the shell is very variable. I have one specimen which is nearly oblong, with a sinuated basal margin and almost central beaks. In this form its external appearance approaches closely that of the Arca centenaria of Say.

Judging from description, this shell must resemble the Petricola centenaria, Conrad, but its nymphæ, teeth and sinuated palleal impression, exclude it from that genus. It is larger and more beautiful than any of its congeners.

GENUS LUCINA.

L. PUNCTULATA, Pl. 34. Fig. 18.

L. testâ rotundâ, lenticulari, sub-æquilaterali, posticè et anticè truncato-rotundatâ, convexâ, tenui, diaphanâ, punctulatâ, substriatâ; striis concentricis, irregularibus, raris; clivo umboniali rotundato; natibus prominentibus, acutis; valvâ sinistrâ dentibus cardinalibus duobus, laterali uno; margine interno integro.

Shell rounded, lenticular, sub-equilateral, truncately rounded posteriorly and anteriorly, convex, diaphanous, punctulate, somewhat striate; striæ concentric, few, irregular; umbonial slope rounded; beaks prominent, acute; left valve with one lateral and two cardinal teeth; internal margin entire.

Diam. .16. Length .32. Breadth .35 of an inch.

Remarks.—The concentric lines of growth are, for the most part, very small, but there are two or three larger ones. The punctulations extend over the whole surface. They are very small, and cannot be seen without the aid of a microscope, but they impart a rough feeling to the shell when handled.

This shell may be readily distinguished from all its fossil congeners by its diaphanous substance and punctulate surface.

L. LENS, Pl. 34. Fig. 19.

L. testâ orbiculari, æquilaterali, valdè convexâ, crassâ, costatâ; costis concentricis, parvis, crebrissimis, planulatis, politis; margine dorsali flexuoso; natibus prominentibus, acutis, incurvis; lunulâ ellipticâ, magnâ, profundâ; dentibus in utrâque valvâ, cardinalibus duabus parvis, lateralibus duabus magnis; margine interno minutè crenulato.

Shell orbicular, equilateral, very convex, thick, costate; costæ concentric, small, very numerous, flattened, polished; dorsal margin flexuose; beaks prominent, acute, incurved; lunulæ elliptical, large, deep; each valve with two small cardinal, and two large lateral teeth; internal margin minutely crenulate.

Diam .28. Length .35. Breadth .38 of an inch.

Remarks.—The ribs are very small, and appear like striæ, unless examined with a microscope. There are occasional larger ones, where the shell appears to have ceased

growing for awhile, and some are minutely wrinkled. The cicatrices are deep and well defined. The whole shell is remarkably globose.

This species agrees pretty well with the description of S. trisulcata, Conrad, but that shell is said to be "obovate," while ours is very rotund. It is also closely allied to some of its congeners from Claiborne.

FAMILY CONCHIDÆ.

GENUS ASTARTE.

A. LINEOLATA, PL. 34. FIG. 20.

A. testâ triangulari, pene æquilaterali, inflatâ, crassâ, striatâ; striis crebrissimis, rotundatis, concentricis; margine basali sub-curvato; natibus elevatis, acuminatis; lunulâ valdè elongatâ; dentibus magnis, valdè divergentibus; margine interno crenulato.

Shell triangular, almost equilateral, inflated, thick, striate; striæ concentric, very numerous, rounded; basal margin somewhat curved; beaks elevated, acuminate; lunule much elongated; teeth large, very divergent; internal margin crenulate.

Diam. .15. Length .18. Breadth .21 of an inch.

Remarks.—The striæ are very regular, minute, and about fifty in number, on a full-grown specimen now before me. The lunule is unusually long and rather broad. The beaks are elevated and produced.

I, at first, regarded this as a young specimen of A. concentrica, Conrad, but the crenulations on the inner margin prove it to be full-grown. In size it approaches the A. lunulata, Con., but the striæ are much smaller and more numerous, and the shell is more inflated.

GENUS CYTHEREA.

C. ELEVATA, PL. 34. FIG. 21.

C. testâ ovatâ, transversâ, inæquilaterali, posticè subtruncatâ, anticè rotundato-angulatâ, inflatâ, crassâ, nitente, substriatâ; striis concentricis, minimis, medio obsoletis; margine basali curvato; margine dorsali angulato; natibus elevatis, prominentibus; dentibus magnis, quorum uno bifido.

Shell transverse, ovate, inequilateral, subtruncate posteriorly, rounded-angular anteriorly, inflated, thick, shining, substriate; striæ concentric, very small, obsolete in the middle; basal margin curved; dorsal margin angular; beaks elevated, prominent; teeth large, one bifid.

Diam. .19. Length .28. Breadth .32 of an inch.

Remarks.—There are no very decided characters about this shell, yet I cannot refer it to any known species. When young, its form is more longitudinal. It is more allied to C. convexa, Say; than to any other shell.

C. SPHÆRICA, PL. 34. FIG. 22.

C. testâ rotundâ, æquilaterali, globosâ, tenui, lævi, politâ; margine dorsali curvato; natibus elevatis, prominentibus, rectis lunulâ minimâ, lanceolatâ; dentibus parvis.

Shell rotund, equilateral, globose, thin, smooth, polished; dorsal margin curved; beaks elevated, prominent, straight; lunule very small, lanceolate; teeth small.

Diam. .18. Length .19. Breadth .20 of an inch.

Remarks.—This shell is rounded and more globose than any of its congeners that I have seen. These characters will serve to distinguish it from all our other fossil species.

GENUS VENUS.

V. ASCIA, PL. 34. FIG. 23.

V. testâ longitudinali, obliquè triangulari, sub-inæquilaterali, posticè et anticè sub-angulatâ, compressâ, crassâ, striatâ; striis concentricis raris; margine basali minimè curvato; margine dorsali angulato; natibus prominentibus, acutis; dentibus tribus divergentibus; cicatrice palleali acutè sinuata; lunulâ magnâ, elevatâ, lineâ impressâ marginatâ.

Shell longitudinal, obliquely triangular, sub-inequilateral, somewhat angular posteriorly and anteriorly, compressed, thick, striate; striæ concentric, few; basal margin slightly curved; dorsal margin angular; beaks prominent, acute; teeth three, diverging; palleal impression acutely sinuate; lunule large, elevated, margined with an impressed line.

Diam. .15. Length .30. Breadth .31 of an inch.

Remarks.—The surface is somewhat rugulose with irregular lines of growth, which, in two or three places, amount almost to ribs. The general outline is that of a triangle with slightly curved sides.

This shell has an unusual shape for a Venus, but the three distinct cardinal teeth will not admit it into any other genus. Although the sinus of the palleal impression is deep and acute, it has not the circular outline of the Artemis.

FAMILY CARDIIDÆ.

GENUS HIATELLA.

H. LANCEA, PL. 34. FIG. 24.

H. testâ transversissimâ, inæquilaterali, posticè et anticè truncato rotundatâ, minimè hiante, valdè compressâ, concentricè striatâ; striis minimis; clivo umboniali elevato; margine basali recto; margine dorsali medio sub angulato, posticè et anticè recto; natibus prominentibus; dentibus magnis.

Shell very transverse, inequilateral, truncately rounded posteriorly and anteriorly, gaping very slightly, very much compressed, concentrically striate; striæ very small; umbonial slope elevated; basal margin straight; dorsal margin sub-angular in the middle, straight posteriorly and anteriorly; beaks prominent; teeth large.

Diam. 10. Length .15. Breadth .29 of an inch.

Remarks.—The lines of growth are very small and inconspicuous. The two teeth in the left valve diverge considerably. The anterior one is bifid.

This genus is placed in the family Cardiidæ by Lamarck, and in the Lithophagidæ by Sowerby, who does not regard it as distinct from Saxicava. Which is right, I have no means of determining, and I therefore leave it where Lamarck places it.

FAMILY ARCACIDÆ.

GENUS NUCULA.

N. DOLABELLA, PL. 34. FIG. 25.

N. testâ obliquè triangulari, inæquilaterali, posticè et anticè angulatâ, inflatâ, crassiusculâ, striatâ; striis concentricis, minutissimis; striis longitudinalibus, pene obsoletis, raris, clivo umboniali precipiti; margine basali curvato; margine dorsali medio acutè angulato, posticè et anticè recto; dentibus parvis; cochleâ parvâ, sub triangulari; margine interno crenulato.

Shell obliquely triangular, inequilateral, posteriorly and anteriorly angulated, inflated, rather thick, striate; concentric striæ very small; longitudinal striæ, few, almost obsolete; umbonial slope steep; basal margin curved; dorsal margin acutely angular in the middle, posteriorly and anteriorly straight; teeth small; fosset small, sub-triangular; internal margin crenulate.

Diam .17. Length .18. Breadth .20 of an inch.

Remarks.—The longitudinal striæ are only visible in a strong light, with a powerful microscope. The concentric lines of growth are also small, with the exception of two or three larger ones.

This may prove to be only a variety of N. obliqua, Say, but it differs from all my specimens of that shell in being more inequilateral and inflated, in the form of the fosset, and in the straight series of teeth.

N. DIAPHANA, PL. 34. FIG. 26.

N. testâ transversâ, inæquilaterali, sub-ellipticâ, posticè et anticè rotundatâ, inflatâ, diaphanâ, tenui, lævi, politâ, intus margaritaceâ; clivo umboniali sub planulato; margine basali curvato; margine dorsali curvato; natibus prominentibus; dentibus valdè arcuatis, anticis quinque, posticis duodecim; cochleâ rhomboideâ, obliquâ; margine interno crenulato.

Shell transverse, inequilateral, sub-elliptic, rounded anteriorly and posteriorly, inflated, diaphanous, thin, smooth, polished, pearly within; umbonial slope somewhat flattened; basal margin curved; dorsal margin curved; beaks prominent; teeth very arcuate, five anterior, twelve posterior; fosset rhomboidal, oblique; internal margin crenulated.

Diam. .04. Length .11. Breadth .15 of an inch.

Remarks.—This little shell, in common with the preceding, has some resemblance to the N. obliqua, Say, but it may be distinguished by its elliptical shape, thin and diaphanous substance, smooth surface, and rhomboidal fosset. The teeth are also more arcuate, and there is a greater disparity between the posterior and anterior series.

In outline, this species is closely allied to the N. antiqua, Mighels and Adams, from the Post-Pliocene of Massachusetts.

N. ÆQUILATERA, PL. 34. FIG. 27.

N. testâ longitudinaliter-ellipticâ, æquilaterali, posticè et anticè sub-curvatâ, inflatâ, crassâ, punctato-costatâ; costis radiantibus, vel punctiferis vel cancellatis; margine basali valdè curvato; margine dorsali angulato; natibus prominulis, incurvis, rectis; dentibus parvis, rectis, anticis tribus, posticis octo; cochleâ parvâ, profundâ; margine interno crenulato.

Shell longitudinally elliptical, equilateral, somewhat curved posteriorly and anteriorly, inflated, thick, punctately costate; costæ small, radiating, punctiferous or cancellate; basal margin very much curved; dorsal margin angulate; beaks somewhat prominent, incurved, straight; teeth small, straight, three anterior, eight posterior; fosset small, deep; margin crenulate within.

Diam. .08. Breadth .10. Length .12 of an inch.

Remarks.—The ribs are small, sometimes divaricate, and punctulate. They occasionally have the appearance of being cancellate. The shorter series of teeth is immediately under the beaks and adjoining the fosset, from which the longer series is removed by a smooth intervening space. This character, and the longitudinal equilateral shape seem to remove it from the genus Nucula, but they can hardly be said to amount to generic distinctions.

This shell bears a general resemblance to the Myoparo costatus, Lea, but its shape does not admit it into that genus.

N. CARINATA. Pl. 34. Fig. 28.

N. testâ transversâ, ovato-acuminatâ, subinæquilaterali, anticè rostratâ, posticè rotundatâ, inflatâ, crassiusculâ, concentricè sulcatâ; sulcis parvis, crebris, regularibus, rotundatis; clivo umboniali elevato, carinato; margine basali curvato; margine dorsali medio angulato, posticè convexo, anticè concavo; natibus minimè elevatis, recurvis; dentibus angulatis, carinatis; anticis quatuordecim, posticis quindecim; cochleâ triangulari, profundâ; margine interno integro.

Shell transverse, ovate-acuminate, sub-inequilateral, anteriorly rostrate, posteriorly rounded, inflated, rather thick, concentrically sulcate; sulci small, numerous, regular, rounded; umbonial slope elevated, carinate; basal margin curved; dorsal margin angular in the middle, posteriorly convex, anteriorly concave; beaks very slightly elevated, recurved; teeth angular, carinate, fourteen anterior, fifteen posterior; fosset triangular, deep; internal margin crenulate.

Diam. .15. Length .18. Breadth .11 of an inch.

Remarks.—The teeth are large and angular, with a carina on the outside edge of the angle. The two series are nearly equal in number.

This shell is very similar to the N. concentrica, Say: the points of difference are, however, the greater proportionate length of our species, its carinate umbonial slope, and peculiar teeth. It is also more equilateral, and has the series of teeth more nearly equal. In these two last characters, it also approaches the N. media, Lea.

N. ACUTIDENS, Pl. 34. Fig. 29.

N. testâ tenui, lævi, politâ; dentibus magnis, longissimis, arcuatis, acutis, perpendicularibus; cochleâ minimè profundâ.

Shell thin, smooth, polished; teeth large, very long, arcuate, acute, perpendicular; fosset shallow.

Diam. —— Length —— Breadth —— of an inch.

Remarks.—I have but a fragment of the hinge of this shell, but the teeth are so remarkable that they appear to distinguish it from all our other species. They are very long, thin, pointed, and placed perpendicularly to the hinge margin, so as to project beyond the shell and be seen nearly as well externally as internally.

FAMILY MYTILIDÆ.

GENUS MODIOLA.

M. SPINIGERA, Pl. 35. Fig. 30.

M. testâ quadrato-ellipticâ, transversâ, inæquilaterali, posticè truncatâ, anticè rotundatâ, sub-inflatâ, tenui, diaphanâ, striatâ; striis parvis, concentricis, irregularibus; clivo umboniali angulato; margine basali recto; margine dorsali recto, spinoso; natibus prominentibus, rotundatis.

Shell quadrately-elliptical, transverse, inequilateral, posteriorly truncate, anteriorly rounded, somewhat inflated, thin, diaphanous, striate; striæ small, concentric, irregular; umbonial slope angulated; basal margin straight; dorsal margin straight, spinous; beaks prominent, rounded.

Diam .08 of an inch. Length .10. Breadth .14.

Remarks.—The spines on the dorsal margin are rather short and few in number; they project perpendicularly from the line of the margin. The substance of the shell is extremely thin. The beaks are long and somewhat incurved.

This little shell is interesting from its singular spinous appendages. No other Modiola, that I have met with, has them. Indeed, the only shell I have ever seen with spines similarly posited, is the Cardium aviculare, Lam., from the Paris Basin.

FAMILY MALLEIDÆ.

GENUS AVICULA.

A. MULTANGULA, PL. 35. FIG. 31.

A. testâ valdè transversâ, sub-inæquilaterali, anticè acutè rostratâ, posticè truncatâ, compressâ, undulatâ, crassâ, striatâ; striis radiantibus minimis, raris; clivo umboniali elevato; margine basali flexuoso; margine dorsali recto; natibus compressis; cardinis areâ triangulari, transversâ; sulco ligamentifero, triangulari, profundo; testæ parte anticâ internè valdè incrassatâ.

Shell very transverse, sub-inæquilateral, acutely rostrate anteriorly, truncate posteriorly, compressed, undulate, thick, striate; striæ few, radiating, very small; umbonial slope elevated; basal margin flexuose; dorsal margin straight; beaks compressed; area of the beaks triangular, transverse; ligamentiferous sulcation triangular, deep; anterior part of the shell, very much incrassated within.

Diam. .18. Length .20. Breadth .45 of an inch.

Remarks.—There are numerous exceedingly minute lines of growth over the surface. The radiating striæ are plainest where they terminate at an angle in the basal margin. The cavity of the beaks is very deep and small. It is abruptly cut off by the incrassation of the anterior end, which is perfectly flat and on a level with the dorsal and basal margins. As all of my specimens are very much worn, I cannot perceive any trace of the muscular impressions.

This curious little shell differs from the genus Avicula somewhat in the hinge. The fosset is more conspicuous than in general with that genus, while the tooth is almost or entirely obsolete. I had at first intended erecting a new genus for it, but the characters of the hinge in this family are so variable and so little to be depended on, that I have thought it best to leave it in this genus. It can hardly be confounded with any of its congeners.

FAMILY PECTENIDÆ.

GENUS PECTEN.

P. MICROPLEURA, PL. 35. FIG. 32.

P. testâ longitudinaliter ovatâ, sub-inflatâ, crassâ, radiatim costatâ; costis parvis, crebris, regularibus, planis, lævibus; margine basali circulari; auribus æqualibus, costatis; natibus compressis, acutis.

Shell longitudinally ovate, somewhat inflated, thick, radiately costate; costæ small, numerous, regular, flat, smooth; basal margin circular; auricles equal, costate; beaks compressed, acute.

Diam. .30. Length .60. Breadth .58 of an inch.

Remarks.—The whole surface, from one auricle to the other, is covered with small, regular, smooth ribs, distant from each other about their own width. They are between thirty and forty in number, besides about ten on each auricle.

This shell may be distinguished from all its congeners of our Tertiary by its small and numerous costæ, and longitudinal form.

P. TENUIS, Pl. 35. Fig. 33.

P. testâ sub-orbiculari, æquilaterali, convexâ, tenui, striatâ; striis radiantibus, crebris, tum magnis, tum parvis; lineis concentricis, minutis, raris; natibus acuminatis, sub-elevatis; auribus magnis, inæqualibus, striatis; testâ interne lævi.

Shell sub-orbicular, equilateral, convex, thin, striate; striæ radiating, numerous, sometimes large, sometimes small; a few minute concentric lines; beaks acuminated, somewhat elevated, auricles large, unequal, striate; shell smooth within.

Diam. .60. Length 2.26. Breadth 2.28 inches.

Remarks.—The striæ are very irregular as to size, and frequently are alternate. Near the base they are much smaller; and are decussated by numerous very minute, concentric lines. On the only valve now before me, they are about one hundred in number. The shell has been quite longitudinal when young, as may be seen from the lines of growth. Three or four of the longitudinal striæ are rather larger than the rest, particularly near the beaks.

This pretty shell was found at Shell Bank near Petersburg, the plantation of E. Ruffin, Esq., and sent by him to my father. It may be distinguished from P. Clintonius, Say, a species to which it is closely allied, by its unequal auricles and striæ, its more longitudinal form, and acuminate beaks.

GENUS PLICATULA.

P. RUDIS, Pl. 35. Fig. 34.

P. testâ longitudinali, orbiculari, planâ, tenui, rugosâ; natibus prominulis, acutis; dentibus magnis; margine intus lato, nigrescente.

Shell longitudinal, orbicular, flat, thin, rugose; beaks prominent, acute; teeth large, internal margin wide and blackish.

Diam .20. Length .68. Breadth .65 of an inch.

Remarks.—The surface is nearly covered with irregular longitudinal wrinkles, which render it very rugose. It is nearly flat and destitute of folds.

This shell may be distinguished from the P. marginata, Say, which it somewhat resembles, by its flat, orbicular form, rugosities, thinness and want of folds. It is much rarer than that species. I found but three or four specimens of it among more than a hundred of the other.

FAMILY PHYLLIDIDÆ.

GENUS CHITON.

C. TRANSENNA, Pl. 35. Fig. 35.

C. testâ—, octovalvi? crassâ, costatâ, dorso valdè elevatâ et angulatâ; valvarum intermediarum areâ centrali costis longitudinalibus rectis, noduliferis, areâ laterali aut lævi aut nodulosâ; valvæ terminalis areâ centrali noduloso costatâ, areâ laterali nodulosâ.

Shell—, eight-valved? thick, costate, very much elevated and angular in the back; central area of the intermediate valves with straight, longitudinal, noduliferous ribs, lateral area smooth or nodulose; central area of the terminal valve nodulosely costate, lateral area nodulose.

Length of valve .15. Breadth do. .50 of an inch.

Remarks.—The ribs of the central area are perfectly parallel, sometimes nearly smooth, and sometimes armed with large nodules in regular series, giving them the appearance of being transversely sulcate. The lateral area, in most of my specimens, is smooth, with the exception of two or three impressed lines of growth, but on some there are numerous spherical tubercles, placed without any apparent order. As these are easily removed, I think it probable that all have been furnished with them, but that, in general, they have been obliterated by attrition. They bear some resemblance to the remains of spines.

This well marked species differs in its sculpture and angulated back from all its congeners.

This shell is interesting as being the first of its genus found in a fossil state in this country. I believe that but one, the C. Grignonensis, Lam., has been described from the Tertiary of Europe.

The third figure is a terminal valve, most probably from a young specimen.

GENUS PATELLA.

P. ACINACES, Pl. 35. Fig. 36.

P. testâ ovatâ, valdè compressâ, falcatâ, depressâ, crassâ, striis concentricis parvis; lineis radiantibus posticè quatuor; aperturâ lineari; apice angulato, recto.

Shell ovate, very much compressed, falcate, depressed, thick, with small concentric striæ, and four radiating lines posteriorly, mouth linear; apex angular, straight.

Height .15. Length .55. Breadth .10 of an inch.

Remarks.—The apex is bent forward a little, and somewhat rounded. Diverging from it posteriorly are four elevated lines, two on each side, which may be traced to the base. The aperture is very narrow, almost acute anteriorly and rounded posteriorly. The substance of the shell is extremely thick, particularly at the apex.

It is not without some hesitation that I have classed this little shell with the genus Patella. Its falcate, compressed shape appears hardly to belong to that genus, and yet is not sufficient to found a new one on. If, however, on farther examination, it should prove distinct, I propose the name of Scaphidium* for it, from its peculiar canoe-like shape.

FAMILY CALYPTRÆIDÆ.

GENUS CEMORIA (Leach.)

C. OBLONGA, Pl. 35. Fig. 37.

C. testa conicâ, sub-elevatâ, tenui, diaphanâ, costatâ; costis longitudinalibus, noduliferis, alternantibus; apicè producto, incurvo, anfractu uno, sinistrorsum deflecto, lævi; foramine elliptico; aperturâ quadratâ, oblongâ.

* A Σκαφιδιον, navigiolum.

Shell conical, somewhat elevated, thin, diaphanous, costate; costæ longitudinal, noduliferous, alternate; apex produced, incurved, with one whorl, deflected to the left; foramen elliptical; aperture quadrate, oblong.

Height .04. Length .07. Breadth .05 of an inch.

Remarks.—The nodules on the ribs are placed in regular series, giving the effect of cancellating transverse striæ. The ribs are alternately large and small, which, I believe, is the case with all our fossil species of these shells. The foramen is widely elliptical, approaching to circular, and placed at some distance posterior to the apex. The apex is large, bent to the left, and twisted into rather more than one whorl. The shell is not much elevated.

But two species of this interesting little genus have been hitherto described. One, the C. noachina, Leach, is from the coast of Great Britain, the other, C. princeps, Mighels and Adams, from that of New England. The one now before us is, I believe, the first fossil species. It differs from the others principally in its minute size, the absence of an internal plate, and the circular form of the foramen.

GENUS CALYPTRÆA.

C. Pileolus, Pl. 35. Fig. 38.

C. testâ irregulariter conicâ, crassâ, sulcatâ; sulcis radiantibus, magnis, irregularibus; striis concentricis, parvis; apice lævi, contorto anfractibus duobus; aperturâ sub-rotundâ; cyatho magno, lato, angulato.

Shell irregularly conical, thick, sulcate; sulci radiating, large, irregular; concentric striæ minute, small; apex smooth, twisted into two whorls; aperture sub-rotund; cyathus large, wide, angular.

Diam. .80. Height .40 of an inch.

Remarks.—This species varies very much both in outline and height, some specimens being nearly flat, while in others the perpendicular distance from the apex to the base is nearly as great as the diameter. The cyathus is large, bent at a right angle, and fastened to the sides of the shell by the two edges. The sulci vary very much in different specimens, both as to number and size.

In general outline, this shell is not unlike the Dispotæa costata, Say, but the form of the cyathus separates it from the Dispotææ, and it also differs in proportionate height. Young specimens are not unlike, in external appearance, the Infundibulum concentricum, herein described, as nearly the upper half of the shell is smooth.

The peculiar voluted form of the apex, which may also be observed in the Dispotæa costata, Say, and D. ramosa, Con., would almost seem to entitle them to a separate division, were it not that in this family the form of the shells is by no means a criterion for that of the animal, and therefore, until the latter has been examined, no separations should be made. M. Lesson and Mr. Owen, who have dissected the inhabitants of these shells, both say that the difference between the animal of Calyptræa and Crepidula is by no means sufficient to establish a generic distinction. Mr. Owen, in a paper read before the Zoological Society, observes, "The soft parts of Crepidula are the same with those of Calyptræa, in all essential points of structure, differing only in the proportionate extent of the anterior part of the foot, and dorsal groove of the mantle." M. Lesson,* as quoted

* Zoologie de la Coquille, Tom. II. p. 388.

by Mr. Broderip, says, "L'animal des Calyptrées et des Crèpidules nous parait ne differer en rien d'essentiel; et quant à la cloison du test, soit que cette cloison soit transversale, soit qu 'elle ne consiste qu 'en lamelles anexées au fond de la coquille, elle presente des passages de ces deux étâts, et ne peut servir qu 'à etablir des simples sous-genres, au grand genre Calyptræa ou Crepidula comme on voudrait l'appeler." I have therefore put the following shells as merely in sub-genera.

SUB-GENUS INFUNDIBULUM (De Montfort.)

I. CONCENTRICUM, Pl. 35. Fig. 39.

I. testâ patelliformi, depresso-conicâ, tenui, simplici; lineis minutis concentricis; apice centrali, anfractu parvo uno; aperturâ sub-rotundâ; cyatho recto, varice marginato.

Shell patelliform, depressed-conical, thin, simple; with minute concentric lines; apex central, with one small whorl; aperture sub-rotund; cyathus straight, margined with a varix.

Diam. .22. Height .09 of an inch.

Remarks.—This shell is entirely simple and patelliform, with the exception of one small whorl at the apex. The cyathus is flat and straight, extending from the centre to the margin, with a thick varix at its outer edge.

The only Infundibulum, to which this is allied, is the I. centrale, Con., but that species is described as ovate, while this is conical, or even slightly concave.

This is one of the shells that show the gradual passage from the Infundibulum to the Crepidula, and the propriety of uniting these genera. Its want of whorls, and the concentric lines of growth, seem to place it in the Calyptrææ, while the cyathus constitutes it an Infundibulum.

SUB-GENUS CREPIDULA.

C. PONDEROSA, Pl. 35. Fig. 40.

C. testâ sub-globosâ, crassissimâ, ponderosâ, convolutâ, rugosâ; sulco prope suturam lato, minimè profundo; suturâ parvâ; apice voluto, rotundato, anfractibus sesqui; aperturâ arctato elliptică; cyatho crassissimo, undulato, acie flexuosâ, vix aperturæ dimidiam æquante.

Shell sub-globose, very thick, ponderous, whorled, rugose; with a wide, shallow sulcation near the suture; suture small; apex voluted, rounded, with a whorl and a half; mouth narrow-elliptical; cyathus very thick, undulate, with a flexuose edge; scarcely half the length of the mouth.

Height 1.15. Length 1.90. Breadth 1.50 inches.

Remarks.—There are occasional irregular lines of growth over the surface. The sulcation near the suture is sometimes scarcely perceptible. It usually continues for about one third of a whorl from the aperture, and then becomes obsolete. The mouth is sometimes very small and nearly round. The cyathus is extremely solid with two depressions on its surface and a waved edge. It is deeply set in the shell, and disappears gradually into the sides, so that its margin cannot be traced. The apex is more voluted than in any species of Crepidula that I have met with.

This fine shell has, most probably, been heretofore confounded with the C. costata, Morton, as it is too common and too conspicuous to have escaped observation, and as there are specimens of both under that name in the collection of the Academy of Natural

Sciences; but our shell is much larger, more ponderous, with the apex more twisted, and without the spines of the C. costata. I have a number of specimens of each now before me, and I find that these characters obtain at all ages.

C. CORNUCOPIÆ, Pl. 35. Fig. 41.

C. testâ valdè elevatâ et convexâ, lævi, politâ, crassâ; apice terminali, valdè producto, voluto, supernè sub-angulato, sinistrorsum deflexo; aperturâ parvâ, ovatâ; cyatho profundo, plano, acie curvo.

Shell much elevated, very convex, smooth, polished, thick; apex terminal, very much produced, whorled, somewhat angular above, turned to the left; aperture small, ovate; cyathus deep, flat, with the margin curved.

Height .16. Length .30. Breadth .18 of an inch.

Remarks.—The apex is very far removed from the margin of the mouth; it is slightly turned to the left, and has about half a volution. The aperture is ovate, approaching to elliptical. The cyathus is situated deep in the shell, so that there is a large cavity under the apex. It is perfectly flat, and its outer margin has a gentle and regular incised curve.

I at first considered this curious little shell as identical with the C. convexa, Say, but the differences in the apex and cyathus render the separation necessary.

C. LAMINA, Pl. 35. Fig. 42.

C. testâ, discoidale, planissimâ, tenui, lævi; apice elevato, polito, sinistrorsum deflexo, anfractibus sesqui; aperturâ magnâ, subrotundâ; cyatho parvo, tenui, convexo.

Shell discoidal, very flat, thin, smooth; apex elevated, polished, deflected to the left, with a whorl and a half; aperture large, subrotund; cyathus small, thin, convex.

Height .03. Length .18. Breadth .15 of an inch.

Remarks.—The most peculiar character in the species now before us, is in the shape of the apex. This is perfectly smooth and polished, rising suddenly from the flat back of the shell, and twisted into about a whorl and a half. The margin of the mouth projects anteriorly beyond it, so that it is invisible on a front view. There are small concentric lines of growth over the surface of the shell. The cyathus is slightly and regularly convex.

When very young, this species, from the peculiar formation of the apex, has a striking resemblance to a small Natica, and I have been for some time in doubt as to what genus a specimen of that age belonged.

This shell is closely allied to the C. plana, Say, but the peculiar apex and nearly flat cyathus at once distinguish it.

FAMILY BULLÆIDÆ.

GENUS BULLA.

B. CYLINDRUS, Pl. 35. Fig. 43.

B. testâ sub-ellipticâ, supernè et infernè acuminatâ, crassâ, politâ, striatâ; spirâ umbilicatâ; anfractu ultimo ad basim et apicem striato; aperturâ falcatâ, infernè latâ; columellâ reflectâ.

Shell subelliptical, acuminate above and below, thick, polished, striate; spire umbilicate; last whorl striate at the base and apex; mouth falcate, wide below; columella reflected.

Length .21. Breadth .10 of an inch.

Remarks.—Although this shell has no very peculiar characters, yet I cannot refer it to any described species. One or two species, the B. St. Hillairii and Dekayi, from Claiborne, are somewhat allied to it, but they are not identical.

FAMILY MELANIDÆ.

GENUS PASITHEA, (LEA.)

P. EXARATA, PL. 35. FIG. 44.

P. testâ subulatâ, acuminatâ, crassâ, imperforatâ, nitente, costatâ; spirâ valdè attenuatâ, mamillatâ, ad apicem lævi; suturis profundis, excavatis; anfractibus quindecim, planulatis, costis obliquè longitudinalibus crebris planis; anfractu ultimo angulato; basi lævi, politâ; aperturâ parvâ, sub-quadratâ, sub-effusâ.

Shell subulate, acuminate, thick, imperforate, shining, costate; spire very attenuate, mamillate, smooth at the apex, sutures deep, excavated; whorls fifteen, flattened, with numerous flat obliquely longitudinal ribs; last whorl angulate; base smooth, polished; mouth small, sub-quadrate, somewhat effuse.

Length .35. Breadth .07 of an inch.

Remarks.—The ribs are slightly oblique. They disappear at both sutures, which are triangular, smooth and deep. They extend, on the last whorl no farther than the angle, leaving the base perfectly smooth. The mouth is ovately quadrate, with sharp angles where the columella and outer lip join the preceding whorls.

This shell appears to resemble the Turritella laqueata, Con., but its larger size, mamilate apex, and angular mouth serve to distinguish it from that species.

P. SUBULA, PL. 35. FIG. 45.

P. testâ subulatâ, crassâ, imperforatâ, costatâ, striatâ; spirâ attenuatâ, obtusâ, mamillatâ, ad apicem politâ; suturis profundis; anfractibus octo, convexis; costis longitudinalibus magnis, crebris, propè basim obsoletis, planulatis, lævibus; striis transversis, parvis, crebris, interruptis; ultimo anfractu rotundato; basi lævi; aperturâ arctatâ, ellipticâ, subeffusâ.

Shell subulate, thick, imperforate, costate, striate; spire attenuate, obtuse, mamillate, polished at the apex; sutures deep; whorls eight, convex; costæ longitudinal, large, numerous, obsolete near the base, flattened, smooth; striæ transverse, small, numerous, interrupted; last whorl rounded; base smooth; mouth narrow, elliptical, sub-effuse.

Length .18. Breadth .05 of an inch.

Remarks.—The costæ continue almost to the base, when they disappear suddenly, leaving a small place smooth immediately behind the columella. The first whorl of the spire is round, somewhat twisted, smooth and polished, forming a remarkable mamelon. The transverse striæ are very small and do not cross the costæ. The mouth is slightly angular above, and somewhat effuse at base.

This shell attains a greater size than that given above. I have several fragments of much larger specimens.

P. EBURNEA, PL. 35. FIG. 46.

P. testâ subulatâ, elongatâ, tenui, politâ, sub-perforatâ, costatâ, striatâ; spirâ attenuatâ, mamillatâ, conicâ; suturis linearibus, impressis; anfractibus duodecim, sub-convexis; costis longitudinalibus, magnis, planis, lævibus; prope suturam superiorem striis transversalibus parvis, crebris; prope suturam inferiorem striis transversalibus magnis, raris; anfractu ultimo rotundato; basi striatâ; perforationè pene obsoletâ; aperturâ ovatâ.

Shell subulate, elongated, thin, polished, sub-perforate, costate, striate; spire attenuate, mamillate, conical; sutures linear, impressed; whorls twelve, slightly convex; ribs longitudinal, large, flat, smooth; striæ transverse, near the upper suture small and numerous, near the lower suture large and unfrequent; last whorl rounded; base striate; perforation almost obsolete; mouth ovate.

Length .41. Breadth .10 of an inch.

Remarks.—The transverse striæ do not cross the ribs, which are perfectly smooth and polished. The whorls are divided about the middle by a deep impressed line. Above it is a series of close, small striæ; below it the striæ are larger and more distant. On the body whorl they end at a rather deeper line about the middle. Here also the ribs end, and there is a smooth space before the striæ of the base commence. These are rather large and not numerous. The mouth is acutely angular above and rounded below. The outer lip is sharp.

This elegant little shell is remarkable for its ivory-like appearance. The peculiar arrangement of its transverse striæ distinguishes it from all other species.

P. LÆVIGATA, Pl. 35. Fig. 47.

P. testâ elevato-conicâ, acuminatâ, imperforatâ, crassâ, lævi, eburneâ, nitente; spirâ attenuatâ, conicâ, acutâ; suturis linearibus, minimis; anfractibus ——, planis; anfractu ultimo sub-angulato; basi lævi; aperturâ obliquè quadrilaterali, supernè et infernè acutè angulatâ, effusâ.

Shell elevated-conical, acuminate, imperforate, thick, smooth, ivory-like, shining; spire attenuate, conical, acute; sutures linear, very small, whorls —— flat; last whorl somewhat angular; base smooth; aperture obliquely quadrilateral, acutely angular above and below; effuse.

Length .08. Breadth .10 of an inch.

Remarks.—The whorls are perfectly flat, so that the outlines of the spire are straight. The surface of the shell is remarkably smooth and shining.

In my largest specimen the lower whorls have been broken off, so that I am unable to give their number. This fragment, however, has about eleven.

This shell bears some resemblance to the P. aciculata, Lea, from Claiborne, but it may readily be distinguished by its larger size, less attenuate shape, and flatter whorls.

P. OVULUM, Pl. 35. Fig. 48.

P. testâ ovatâ, sub-elongatâ, tenui, imperforatâ, lævi, nitente; spirâ breviusculâ, ovatâ, obtusâ; suturis profundis, linearibus; anfractibus quatuor, convexis; anfractu ultimo rotundato; basi lævi; aperturâ ovatâ; columellâ crassâ, latâ; lævi.

Shell ovate, somewhat elongate, thin, imperforate, smooth, shining; spire rather short, ovate, obtuse; sutures deep, linear; whorls four, convex; last whorl rounded; base smooth; mouth ovate; columella thick, wide, smooth.

Length .15. Breadth .08 of an inch.

Remarks.—The mouth is angular above and rounded below. The sutures are deep, owing to a slight conical depression of the whorls immediately at their junction with those above.

I know no species to which the above is allied.

P. DIAPHANA, Pl. 35. Fig. 49.

P. testâ ovato-elongatâ, acuminatâ, tenui, sub-perforatâ, diaphanâ, striatâ; spirâ subattenuatâ, mamillatâ; suturis impressis, linearibus; anfractibus sex, convexis; striis minutis, transversalibus; anfractu ultimo rotundato; basi striatâ; aperturâ elongato-quadratâ, sub-effusâ.

Shell ovately elongate, acuminate, thin, sub-perforate, diaphanous, striate; spire somewhat attenuate, mamillate; sutures impressed, linear; whorls six, convex; striæ transverse, minute; last whorl rounded; base striate; mouth elongately-quadrate, sub-effuse.

Length .22. Breadth .10 of an inch.

Remarks.—The striæ are very small and only to be seen with the aid of a microscope. The shell is very thin,—so much so as to be somewhat translucent. The mouth is angular above and below. There is a slight angle on the superior part of the whorls, immediately below the upper suture.

This pretty little shell has no decided resemblance to any of our fossil species. P. sulcata, Lea, approaches it more nearly than any other.

P. TURBINOPSIS, Pl. 35. Fig. 50.

P. testâ ovato-conoideâ, sub-elevatâ, tenui, lævi, imperforatâ; spirâ breviusculâ, rotundatâ, obtusâ; suturis profundis; anfractibus quatuor, convexis, propè suturam superiorem sub-canaliculatis; anfractu ultimo rotundato; basi lævi; aperturâ magnâ, sub-rotundâ.

Shell ovately conoidal, somewhat elevated, thin, smooth, imperforate; spire rather short, rounded, obtuse; sutures deep; whorls four, convex, sub-canaliculate near the upper suture; last whorl rounded; base smooth; mouth large, sub-rotund.

Length .10. Breadth .05 of an inch.

Remarks.—The whorls have a small angle immediately at the upper suture, which gives them somewhat the appearance of being channelled. The mouth is oblique, nearly round, and has the lower margin produced obliquely, below the inner lip.

I have felt some doubts in placing this shell among the Pasitheæ, as it hardly has the effuse mouth of that genus, but its characters seem to agree better with it than with any other.

This little shell resembles some of our recent species of Amnicola;—it also approaches the Turbo minutus, Totten (Cingula minuta, Gould,) but it is more globose and differs in size.

P. ORNATA.

P. testâ ovato-subulatâ, crassâ, sub-perforatâ, costatâ, striatâ; spirâ elevatâ, mamillatâ, prope apicem lævi; suturis linearibus; anfractibus quinque, valdè convexis; costis transversalibus, latis, politis; striis longitudinalibus, minutissimis; anfractu ultimo rotundato; basi costulatâ; perforatione pene obsoletâ; aperturâ ovatâ, effusâ.

Shell ovately subulate, thick, sub-perforate, costate, striate; spire elevated, mamillate, smooth near the apex; sutures linear; whorls five, very convex; costæ transverse, wide, polished; striæ longitudinal, very minute; last whorl rounded; base costulate; perforation almost obsolete; mouth ovate, effuse.

Length —— Breadth ——

Remarks.—On the upper whorls the costæ are five in number, on the last one they are much more numerous. Those on the base are smaller and closer together. Near the lower sutures, on the whorl next the last, is a rib larger than the rest, with an impressed line in its centre, making a kind of double rib. It may be traced round the middle of the last whorl. As I have but one specimen before me, I cannot decide whether this is a general character or not. The longitudinal striæ are only to be seen in the intervals of the ribs. They are very small and sometimes disappear.*

* I unfortunately lost my only specimen of this shell after describing, but before measuring or making a drawing of it. I am, therefore, unable to give either the dimensions or a figure. It was, however, not more than a quarter of an inch in length, at the utmost.

FAMILY NERITIDÆ.

GENUS NATICA.

N. APERTA, Pl. 36. Fig. 51.

N. testâ obliquè ellipticâ, tenui, costulatâ, sub-striatâ, perforatâ; spirâ depressâ, ovatâ, obtusâ, propè apicem lævi; suturis parvis, linearibus; anfractibus quatuor, convexis; costulis transversalibus, crebris, planis, quadrangularibus; striis longitudinalibus, minutissimis; anfractu ultimo ovato; basi obliquè costulatâ; perforatione parvâ, angustâ; aperturâ maximâ, supernè sinuatâ, infernè ellipticâ.

Shell obliquely elliptical, thin, costulate, sub-striate, perforate; spire depressed, ovate, obtuse, smooth near the apex; sutures small, linear; whorls four, convex; costulæ numerous, transverse, quadrangular, flat; striæ longitudinal, very small; last whorl ovate; base obliquely costulate; perforation small, narrow; mouth very large, sinuate above, elliptical below.

Length .70. Breadth .62 of an inch.

Remarks.—The costulæ are small, wider than the spaces between them, and very numerous. The longitudinal lines of growth are exceedingly minute; so much so as to be invisible to the naked eye. Both ribs and striæ become obsolete on the upper whorls, so that the two or three nearest the apex are smooth. The mouth is somewhat lunate, contracted above and expanded below. The umbilicus is small, and nearly concealed by the columella.

This shell is closely allied to the N. fragilis, Conrad, and it is with some hesitation that I separate it. It, however, differs in the ribs, the umbilicus, and the shape of the mouth.

N. SPHÆRULUS, Pl. 36. Fig. 52.

N. testâ globoso-acuminatâ, obliquâ, tenui, lævi, politâ, imperforatâ; spirâ breviusculâ, sub-conicâ, acutâ; suturis parvis, impressis; anfractibus quatuor, sub-convexis; anfractu ultimo rotundato; basi lævi; umbilico occulto; callo semicirculari, lineâ impressâ marginato; aperturâ semi-ovatâ; columellâ rectâ, supernè incrassatâ.

Shell globosely acuminate, oblique, thin, smooth, polished, imperforate; spire rather short, sub-conical, acute; sutures small, impressed; whorls four, somewhat convex; last whorl rounded; base smooth; umbilicus hidden; callus semicircular, margined by an impressed line; mouth semi-ovate; columella straight, incrassated above.

Length .12. Breadth .11 of an inch.

Remarks.—This shell is too small and perfect to be the young of so large a species as N. duplicata, which it resembles. Out of twenty or thirty specimens the admeasurements given above were the largest, the others decreasing to a size scarcely visible without a microscope. The only other species to which it is allied is the N. percallosa, Conrad, but the small size and more elevated spire distinguish it.

N. CRASSILABRUM, Pl. 36. Fig. 53.

N. testâ transversè ellipticâ, depressâ, crassâ, lævi, politâ, imperforatâ; spirâ conicâ, obtusâ, valdè depressâ; suturis profundis, linearibus; anfractibus quatuor, convexis, supernè planulatis; anfractu ultimo rotundato; basi lævi; umbilico occulto, parvo; aperturâ sub-rotundâ; labro supernè valdè incrassato.

Shell transversely elliptical, depressed, thick, smooth, polished, imperforate; spire conical, obtuse, very much depressed; sutures deep, linear; whorls four, convex, flattened above; last whorl rounded; base smooth; umbilicus hidden, small; mouth sub-rotund; outer lip much thickened above.

Length .16. Breadth .25 of an inch.

Remarks.—The flattened whorls and incrassated outer lip at once distinguish this shell from all its congeners.

FAMILY PLICACIDÆ.

GENUS ACTEON.

A. GRANULATUS, Pl. 36. Fig. 54.

A. testâ subulatâ, crassâ, sub-perforatâ, noduloso-costatâ; spirâ elevatâ, obtusâ, mamillatâ, ad apicem politâ; suturis impressis; anfractibus sex, convexis; costis transversalibus, planis, regulariter nodulosis, unâ lævi prope suturam inferiorem; anfractu ultimo rotundato; perforatione minimâ; basi costatâ; aperturâ ovatâ, superne angulatâ, sub-effusâ; plicâ columellari magnâ, acutâ.

Shell subulate, thick, sub-perforate, nodulously costate; spire elevated, obtuse, mamillate, polished at the apex; sutures impressed; whorls six, convex; ribs transverse, flat, regularly nodulous, a smooth one near the lower suture; last whorl rounded; base costate; perforation very small; mouth ovate, angular above, somewhat effuse; fold on the columella large, acute.

Length .18. Breadth .08 of an inch.

Remarks.—The nodules on the ribs are small and in regular order, giving the shell a granulate and cancellated appearance. The fold on the columella is placed about the middle, and is quite large. The mouth is rounded below and acutely angular above. On the body whorl the ribs are about eight in number, while there are five on those of the spire. The basal costæ are smooth and smaller.

Judging from description, this shell is not unlike A. pomilius and A. idoneus, Conrad; but may be distinguished by the perforation, mamillate apex, and the smooth rib near the lower suture.

A. GLOBOSUS, Pl. 36. Fig. 55.

A. testâ ovatâ, crassâ, cancellatâ, umbilicatâ; spirâ brevi, ad apicem lævi et politâ; suturis parvis; anfractibus tribus, convexis, rapidè crescentibus, supra planulatis; costis octo, transversis, magnis; striis longitudinalibus, parvis, irregularibus; anfractu ultimo rotundato; basi cancellatâ; umbilico magno; aperturâ magnâ, sub-ellipticâ; columellâ rectâ; plicâ columellari magnâ, acutâ.

Shell ovate, thick, cancellate, umbilicate; spire short, smooth and polished at the apex; sutures small; whorls three, rapidly increasing, convex, flattened above; costæ eight, transverse, large; striæ longitudinal, small, irregular; last whorl rounded; base cancellate; umbilicus large; aperture large, sub-elliptical; columella straight; fold on the columella large, acute.

Length .10. Breadth .08 of an inch.

Remarks.—The longitudinal striæ occasionally do not cross the ribs, which, in that case, are rounded and polished. The mouth is somewhat semicircular, with the columella for a base. On the upper whorls there are but four ribs, the rest being concealed by the succeeding growth. About a whorl and a half near the apex, are perfectly smooth.

This is a very pretty little shell, and bears no decided resemblance to any of our fossil species. It is unusually globose for an Acteon, but can hardly be placed in the kindred genus Tornatella.

A. TURBINATUS, Pl. 36. Fig. 56.

A. testâ ovato-conicâ, crassâ, lævi, sub-perforatâ; spirâ breviusculâ, conicâ, obtusâ; suturis parvis, linearibus; anfractibus quinque, planulatis; anfractu ultimo sub-angulato; basi lævi; perforatione minimâ; aperturâ ovatâ, sub-effusâ; plicâ columellari magnâ, acutâ.

Shell ovately conical, thick, smooth, sub-perforate; spire rather short, conical, obtuse; sutures small, linear; whorls five, flattened; last whorl somewhat angular; base smooth; perforation very small; mouth ovate, sub-effuse; fold on the columella large, acute.

Length .12. Breadth .08 of an inch.

Remarks.—The fold on the columella is placed about the middle. It can scarcely be seen on a front view; but when the shell is placed obliquely, it appears very large. The mouth is acutely angular above, and rounded and somewhat effuse below. On one specimen I have observed a small impressed transverse line near the upper suture, but my other ones want it.

This little shell, though without any conspicuous characteristics, does not resemble any of our described species.

A. ANGULATUS, Pl. 36. Fig. 57.

A. testâ subulatâ, infernè ovatâ, crassâ, imperforatâ, lævi; spirâ attenuatâ, conicâ, mamillatâ; suturis profundis; anfractibus sex, planulatis, propè suturam inferiorem angulatis; anfractu ultimo angulato; basi lævi; aperturâ parvâ, subellipticâ; plicâ columellari obtusâ, obliquâ.

Shell subulate, ovate below, thick, imperforate, smooth; spire attenuate, conical, mamillate; sutures deep; whorls six, flattened, angulate near the lower suture; last whorl angular; base smooth; mouth small, sub-elliptical; fold on the columella obtuse, oblique.

Length .12. Breadth .05 of an inch.

Remarks.—The mouth is nearly elliptical. The angle on the lower part of the whorls is only visible on the inferior ones. Nearer the apex, it becomes obsolete, or is covered by the succeeding whorls.

This shell is not unlike the A. melanellus, Lea, but differs from that species in the angular whorls, smaller size, and want of an umbilicus.

A. GLANS, Pl. 36. Fig. 58.

A. testâ sub-ovatâ, tenui, imperforatâ, lævi, glabrâ; spirâ ovato-conicâ, brevi, mamillatâ; suturis profundis; anfractibus quatuor, minimè convexis, ad suturam superiorem sub-canaliculatis; anfractu ultimo rotundato; basi lævi; aperturâ ovatâ, valdè effusâ; plicâ columellari parvâ, obliquâ.

Shell sub-ovate, thin, imperforate, smooth, glabrous; spire ovately-conical, short, mamillate; sutures deep; whorls four, very slightly convex, sub-canaliculate at the upper suture; last whorl rounded; base smooth; mouth ovate, very effuse; fold on the columella small, oblique.

Length .10. Breadth .05 of an inch.

Remarks.—The mouth is very effuse below; so much so, indeed, that it appears to have the rudiments of a canal. It is acutely angular above. The fold on the columella is obtuse, rising abruptly on the upper part and declining gradually on the lower.

This little shell, from its ovate outline, and the form of its fold, should perhaps be placed in the Tornatella, but the limits of these two genera are so indistinct that it is difficult to decide where the boundary between them exists. I have felt the same doubt with respect to several of the following species, as the A. sculptus, nitens, &c.

A. SCULPTUS, PL. 36. FIG. 59.

A. testâ ovato-acuminatâ, crassâ, sub-perforatâ, cancellatâ; spirâ brevi, conicâ, mamillatâ, ad apicem lævi; suturis profundis; anfractibus quinque, convexis, ad suturam superiorem sub-canaliculatis; striis transversis, crebris, magnis; sulcis longitudinalibus, parvis, propè suturam inferiorem obsoletis; anfractu ultimo rotundato; basi striatâ; perforatione minimâ; aperturâ ovatâ, effusâ; plicâ columellari obliquâ, obtusâ.

Shell ovate-acuminate, thick, sub-perforate, cancellate; spire short, conical, mamillate, smooth at the apex; sutures deep; whorls five, convex, sub-canaliculate near the upper sutures; striæ transverse, numerous, large; sulci longitudinal, small, nearly obsolete at the lower suture; last whorl rounded; base striate; perforation very small; mouth ovate, effuse; fold on the columella oblique, obtuse.

Length .11. Breadth .05 of an inch.

Remarks.—The transverse striæ are extremely numerous. Near the base they become alternate. The longitudinal sulcations are small; they are very perceptible near the superior suture, but gradually become obsolete as they approach the lower part of the whorls. The perforation is extremely minute,—so much so as to be almost obsolete. The margin of the mouth is continuous round the inner lip. This character is wanting in young and unfinished specimens. The fold on the columella can scarcely be seen on a front view. The upper side of it is perpendicular, the lower very oblique.

This shell and the last are almost too bullate to be classed with the Acteons. They may, perhaps, more properly belong to the Tornatellæ.

A. NITENS, PL. 36. FIG. 60.

A. testâ ovato-acuminatâ, crassâ, perforatâ, lævi, politâ; spirâ subulatâ, mamillatâ; suturis impressis, profundis; anfractibus quinque, convexis; anfractu ultimo rotundato; basi lævi; perforatione parvâ; aperturâ ovatâ, elongatâ, effusâ; plicâ columellari obtusâ, crassâ.

Shell ovate-acuminate, thick, perforate, smooth, polished; spire subulate, mamillate; sutures impressed, deep; whorls five, convex; last whorl rounded; base smooth; perforation small; mouth ovate, elongated, effuse; fold on the columella obtuse, thick.

Length .18. Breadth .10 of an inch.

Remarks.—The mouth is large, acute above and rounded and effuse below. The last whorl expands rather suddenly beyond the line of the rest, and is more than half the length of the shell. The fold on the columella is broad at base, but slightly elevated, and obtuse. The surface of the shell is remarkably glabrous and shining.

The external outline has more the aspect of a Phasianella than that of an Acteon. I know none of its congeners to which it is allied.

A. MILIUM, PL. 36. FIG. 61.

A. testâ ovato-conicâ, crassâ, perforatâ, striatâ, politâ; spirâ sub-attenuatâ, conicâ, obtusâ, ad apicem lævi; suturis linearibus, impressis; anfractibus quinque, planulatis; striis transversalibus, raris, impressis; anfractu ultimo rotundato; basi crebrè striatâ; perforatione parvâ; aperturâ ovatâ, integrâ; plicâ columellari magnâ, acutâ, ad basim latâ.

Shell ovately conical, thick, perforate, striate, polished; spire somewhat attenuate, conical, obtuse, smooth at the apex; sutures linear, impressed; whorls five, flattened; striæ transverse, few, impressed; last whorl rounded; base closely striate; perforation small; mouth ovate, entire; fold on the columella large, acute, wide at base.

Length .10. Breadth .04 of an inch.

Remarks.—On the upper whorls the striæ are three in number. On the last whorl they are much more numerous, particularly towards the base, where they become

smaller and closer. The mouth is not effuse, acutely angular above and rounded below. The fold on the columella is unusually large, and is very wide at base.

The only species of Acteon, with which this little shell could be confounded, is the A. melanoides, Conrad, but its smaller size, more ovate shape, and greater number of striæ on the body whorl, sufficiently distinguish it from that species.

A. SIMPLEX, Pl. 36. Fig. 62.

A. testâ elevato-conicâ, acuminatâ, crassâ, lævi, perforatâ; spirâ attenuatâ, mamillatâ; suturis excavatis, profundis; anfractibus sex, planis, ad suturam inferiorem angulatis; anfractu ultimo angulato; basi lævi; perforatione parvâ; aperturâ quadratâ, effusâ; plicâ columellari lamellari, acutâ.

Shell elevately conical, acuminate, thick, smooth, perforate; spire attenuate, mamillate; sutures excavated, deep; whorls six, flat, angulated at the lower suture; last whorl angular; base smooth; perforation small; mouth quadrate, effuse; fold on the columella lamellar, acute.

Length .12. Breadth .05 of an inch.

Remarks.—The mamelon of the apex is large and very irregular in its shape. The angle on the whorls is very near the lower suture, which gives them somewhat the appearance of being canaliculate. The fold on the columella is acute and very thin. The mouth is angular above and below.

This shell bears a general resemblance to some of the smooth Acteons from Claiborne, without being sufficiently allied to enable me to class it with any of them. It also closely approaches the A. angulatus, herein described, but the umbilicus of this species readily distinguishes it.

GENUS PYRAMIDELLA.

P. SUTURALIS, Pl. 36. Fig. 63.

P. testâ turritâ, elevatâ, crassâ, lævi, nitente, perforatâ, sulcatâ; spirâ conicâ, attenuatâ; suturis linearibus; anfractibus octo, planis; anfractu ultimo angulato, medio sulcato; sulco uno, parvo, transverso; basi carinatâ; perforatione minimâ; aperturâ quadratâ, valdè effusâ; columellâ triplicatâ, plicâ unâ maximâ acutâ, duobus parvis; labro dentibus magnis internis, aut duobus aut tribus.

Shell turrited, elevated, thick, smooth, shining, perforated, sulcate; spire conical, attenuate; sutures linear; whorls eight, flat; last whorl angular, sulcate in the middle; sulcus transverse, small; base carinate; perforation very small; mouth quadrate, very effuse; columella with three folds, one very large and acute, the others small; outer lip with two or three large teeth internally.

Length .20. Breadth .08 of an inch.

Remarks.—The sulcation on the last whorl is seen at the upper part of those of the spire, forming an apparently double suture. This sulcation is triangular, with one side perpendicular and the other very sloping. Immediately above it is a little raised ridge, or small carina. The sulcation is placed directly on the angle of the last whorl. Of the folds on the columella, the upper one is large and horizontal, situated immediately at its junction with the preceding whorl. The two lower ones are smaller and oblique. The teeth on the outer lip are generally two, placed close together near the middle, but there is sometimes a third, smaller one, below them. The carina on the base is broad and little elevated, immediately surrounding the umbilicus. The mouth is acutely angular above and below. This shell attains a greater size than that mentioned above, as I have an imperfect specimen larger than the one whose dimensions and figure are given.

Judging from description, this shell is not unlike the P. larvata, Con., from Claiborne, but that species is not mentioned as having three folds on the columella, or the teeth on the outer lip.

P. ELABORATA, Pl. 36. Fig. 64.

P. testâ elevato-conicâ, crassâ, imperforatâ, costatâ, striatâ; spirâ minimè ovatâ, mamillatâ; suturis linearibus, impressis; anfractibus sex, convexis; costis longitudinalibus, crebris, planis, lævibus, politis; striis transversis, parvis; anfractu ultimo rotundato; aperturâ ellipticâ; columellâ plicis tribus magnis.

Shell elevately conical, thick, imperforate, costate, striate; spire slightly ovate, mamillate; sutures linear, impressed; whorls six, convex; costæ longitudinal, numerous, flat, smooth, polished; striæ transverse, small; last whorl rounded; mouth elliptical; columella with three large folds.

Length .15. Breadth .08 of an inch.

Remarks.—The transverse striæ are very small and do not cross the ribs. The folds on the columella are of nearly equal size, but the upper one is rather larger than the others.

As the only two specimens of this shell in my possession have had the lower whorl broken off, I am unable to give the full size or number of whorls, as well as to determine whether there are teeth on the outer lip or not.

I have never seen a Pyramidella with a sculpture as elaborate as this. The genus mostly contains plain species.

FAMILY SCALARIDÆ.

GENUS SCALARIA.

S. ACICULA, Pl. 36. Fig. 65.

S. testâ turritâ, crassâ, imperforatâ, costatâ; spirâ attenuatâ, ad apicem vix lævi; suturis profundis; anfractibus septem, valdè convexis; costis longitudinalibus, lamellaribus, acutis, ad basim decrescentibus; anfractu ultimo rotundato; basi carinâ minimâ transversâ; aperturâ rotundâ.

Shell turrited, thick, imperforate, costate, spire attenuate, nearly smooth at the apex; sutures deep; whorls seven, very convex; costæ longitudinal, lamellar, acute, decreasing at the base; last whorl rounded; base with a very small transverse carina; mouth round.

Length .20. Breadth .10 of an inch.

Remarks.—The carina on the base is small and does not interfere with the ribs, which continue to the columella. The whorls are perfectly smooth with the exception of the ribs, which, on the body whorl are fifteen in number.

S. CORNIGERA, Pl. 36. Fig. 66.

S. testâ elevato-conicâ, scalariformi, imperforatâ, crassiusculâ, costatâ; spirâ attenuatâ, obtusâ, conicâ; suturis valdè impressis; anfractibus sex, convexis, supernè valdè angulatis; costis sub-tenuibus, planis, supernè valdè productis et acutè angulatis; basi lævi; aperturâ rotundatâ, minimè effusâ.

Shell elevately conical, scalariform, imperforate, rather thick, costate; spire attenuate, obtuse, conical; sutures very much impressed; whorls six, convex, very angular above; costæ rather thin, flat, very much produced and acutely angled above; base smooth; mouth round, slightly effuse.

Length .16. Breadth .08 of an inch.

Remarks.—On the upper part of the spire the angle of the whorls is near their middle. Below, it is close to the superior suture. The ribs rise, near the upper part of the whorls, to a short spine, and descend rapidly to the suture, where they become obsolete. The mouth is small and nearly round.

This little shell I at first thought to be merely the young of S. pachypleura, Conrad; but, as it is but one fifth the size of that species, with the same number of whorls, they cannot be identical.

S. MICROPLEURA, Pl. 36. Fig. 67.

S. testâ elevato-pyramidali, tenui, imperforatâ, costulatâ; spirâ attenuatâ, conicâ, obtusâ; suturis parvis, linearibus; anfractibus sex, convexis; costis minutis, crebrissimis; anfractu ultimo rotundato; basi lævi; aperturâ ovatâ, marginibus supernè disjunctis; labro acuto.

Shell elevately pyramidal, thin, imperforate, costulate; spire attenuate, conical, obtuse; sutures small, linear; whorls six, convex; ribs very small and numerous; last whorl rounded; mouth ovate, with the margins disunited above; outer lip acute.

Length .10. Breadth .05 of an inch.

Remarks.—I have felt some hesitation in placing this shell among the Scalariæ, as the small costæ and incontinous peritreme of the mouth seem scarcely to warrant it.

S. MICROSTOMA, Pl. 36. Fig. 68.

S. testâ subulato-conicâ, tenui, imperforatâ, costatâ; spirâ conicâ, valdè attenuatâ, obtusâ; suturis impressis, interruptis; anfractibus septem, valdè convexis; costis raris, elevatis, reflexis; anfractu ultimo rotundato; basi sub-carinatâ; aperturâ parvâ, obliquâ, sub-rotundâ; labro valdè incrassato.

Shell subulate-conical, thin, imperforate, costate; spire conical, very attenuate, obtuse; sutures impressed, interrupted; whorls seven, very convex; costæ few, elevated, reflexed; last whorl rounded; base sub-carinate; mouth small, oblique, sub-rotund; outer lip very much thickened.

Length .28. Breadth .12 of an inch.

Remarks.—The carina of the base is very small; it does not cross the costæ, which continue to the columella. The mouth is unusually small and nearly round. The costæ are ten in number on the last whorl, quite prominent, and reflexed. In full grown specimens the one which forms the outer lip is much thicker than the rest. The ribs of one whorl do not join those of the next, but lap over very closely. This causes the sutures to be continually interrupted.

This shell bears a close resemblance to S. acicula, herein described, but differs in being more subulate, having fewer and reflected ribs, and a smaller basal carina.

GENUS DELPHINULA.

D. COSTULATA, Pl. 36. Fig. 69.

D. testâ orbiculari, depressâ, crassâ, costatâ, striatâ; spirâ brevissimâ, acuminatâ, acutâ; suturis linearibus; anfractibus sex, valdè convexis, suprâ planulatis et lævibus; costis parvis, crebris, transversis, politis; striis longitudinalibus, obliquis, minutissimis; anfractu ultimo rotundato; basi costatâ; umbilico magno, profundo, intus lævi; aperturâ rotundâ, supra subcanaliculatâ.

Shell orbicular, depressed, thick, costate, striate; spire very short, acuminate, acute; sutures linear; whorls six, very convex, smooth and flattened above; costæ transverse, small, numerous, polished; striæ longitudinal, oblique, very minute; last whorl rounded; base costate, umbilicus large, deep, smooth within, mouth round, sub-canaliculate above.

Length .08. Breadth .15 of an inch.

Remarks.—The longitudinal striæ are so minute as to escape observation, unless assisted by a powerful microscope. They do not cross the ribs. The mouth is smooth within, and almost exactly round, except at its junction with the preceding whorl, where there is a small channel.

This shell bears some resemblance to the Turbo lineatus, Lea, but is separated from that shell by its entire mouth, larger umbilicus, &c.

I have felt some doubt in placing this and two or three of the following shells in the genus Delphinula. Their general appearance would seem rather to make them approach the Turbo, but their entire mouths constitute them true Delphinulæ. The genus Skenea, Fleming, seems well fitted to receive them, but it is described as having the "aperture dilated," a character which is wanting in the shells at present under consideration.

D. CONCAVA, PL. 36. FIG. 70.

D. testâ concavâ, orbiculari, depressâ, supra planulatâ, tenui, nitente, sub-striatâ; spirâ brevissimâ, obtusâ; suturis linearibus; anfractibus quatuor, rapidè crescentibus, planulatis; striis longitudinalibus, parvis, rarissimis; anfractu ultimo sub-angulato; basi striatâ; umbilico magno, profundo, intus striato; aperturâ magnâ, ovatâ.

Shell concave, orbicular, depressed, flattened above, thin, shining, sub-striate; spire very short, obtuse; sutures linear; whorls four, rapidly increasing, flattened; striæ longitudinal, very few, small; last whorl somewhat angular; base striate; umbilicus large, deep, striate within; mouth large, ovate.

Length .08. Breadth .20 of an inch.

Remarks.—The umbilicus is wide and open, exposing the spire, nearly to the apex. The lines of growth are very infrequent and irregular, both as to size and direction.

This little shell has no very decided character, and yet it cannot be placed with any species hitherto described. Its nearest analogue is the recent Planorbis parvus, Say, which it much resembles in general outline.

D. LIPARA, PL. 36. FIG. 71.

D. testâ orbiculari, depressâ, sub-planulatâ, crassiusculâ, lævi, nitente; spirâ brevissimâ, rotundatâ; suturis impressis; anfractibus quinque, convexis, politis; anfractu ultimo rotundato; basi lævi; umbilico latissimo, profundo; aperturâ rotundâ.

Shell orbicular, depressed, somewhat flattened, rather thick, smooth, shining; spire very short, rounded; sutures impressed; whorls five, convex, polished; last whorl rounded; base smooth; umbilicus very wide, deep; mouth round.

Length .05. Breadth .10 of an inch.

Remarks.—In this shell the umbilicus is wider than in most of those herein described. The mouth is small and very nearly round. The surface has a very high polish, and a somewhat greasy look.

This species is very much like the Skenea depressa, a recent shell from the coast of England, but it is much larger, and differs in the shape of the aperture.

D. OBLIQUÈ-STRIATA, PL. 36. FIG. 72.

D. testâ orbiculari, depressâ, crassâ, diaphanâ, sub-cancellatâ; spirâ brevissimâ, ovatâ, propè apicem longitudinaliter et profundè sulcatâ; suturis impressis, linearibus; anfractibus quatuor, convexis; sulculis longitudinalibus, ad suturam inferiorem pene obsoletis; striis obliquè transversis, parvis, crebris; anfractu ultimo tum carinato tum angu-

lato, ad suturam lævi; basi striatâ, profundè sulcatâ; umbilico magno, profundo, carinâ marginato, intus lævi; aperturâ rotundâ.

Shell orbicular, depressed, thick, diaphanous, sub-cancellate; spire very short, ovate, longitudinally and deeply sulcate near the apex; sutures impressed, linear; whorls four, convex; sulculi longitudinal, nearly obsolete at the lower suture; striæ obliquely transverse, small, numerous; last whorl sometimes carinate, sometimes angulate, smooth near the suture; base striate, deeply sulcate; umbilicus large, deep, margined with a carina, smooth within; mouth round.

Length .04. Breadth .10 of an inch.

Remarks.—The longitudinal sulci are quite large on the upper whorls, but become smaller and closer as they approach the last whorl, while on the base they again increase. The striæ are very oblique, but are more nearly transverse than longitudinal. On the last whorl, they form cancellations with the sulci, and are obsolete near the suture as they approach the mouth. The umbilicus is carinate and scalariform, decreasing from whorl to whorl in rectangular steps. The periphery of the last whorl is extremely variable, being in some specimens almost round, and in others angular and carinate. The mouth is almost a perfect circle.

The carinate umbilicus and oblique striæ separate this pretty little shell from all its congeners.

D. TROCHIFORMIS, PL. 36. FIG. 73.

D. testâ conicâ, sub-lenticulari, crassâ, striatâ; spirâ sub-ovatâ, obtusâ, depressâ; suturis canaliculatis; anfractibus tribus, sub-convexis; striis transversis, parvis, raris; anfractu ultimo acutè angulato, duplicè carinato; basi striatâ; umbilico parvo, profundo, striis magnis marginato; aperturâ sub-triangulari; labro crassissimo.

Shell conical, somewhat lenticular, thick, striate; spire sub-ovate, obtuse, depressed; sutures canaliculate; whorls three, rather convex; striæ transverse, few, small; last whorl acutely angular, doubly carinate; base striate; umbilicus small, profound, margined with large striæ; mouth sub-triangular; lip very thick.

Length .08. Breadth .09 of an inch.

Remarks.—The striæ on the upper part of the last whorl are few in number and very faint; on the base, however, they are more numerous and deeper. There are usually two or three of larger size round the umbilicus. The periphery of the last whorl has two carinæ, one upon the angle, and one immediately above it. On the superior whorls these are both hidden.

This shell, in outline, seems rather to be a Trochus than a Delphinula. Its spire is very much elevated, and its umbilicus unusually small for this genus, but the entire margin of the mouth is a character too well marked to be neglected.

D. GLOBULUS, PL. 36. FIG. 74.

D. testâ transversè sub-globosâ, crassâ, cancellatâ; spirâ planulatâ, obtusâ, ad apicem lævi; suturis vix obsoletis; anfractibus tribus, rapidè crescentibus, supra angulatis et planulatis; costis transversis, octo, magnis; striis longitudinalibus, parvis, irregulâribus; anfractu ultimo rotundata; basi costatâ et striatâ; umbilico parvo, arctato; aperturâ sub-rotundâ, integrâ.

Shell transversely sub-globose, thick, cancellate; spire flattened, obtuse, smooth at the apex; sutures nearly obsolete; whorls three, rapidly increasing, angular and flattened above; costæ transverse, eight, large; striæ longitudinal, small, irregular; last whorl rounded; base costate and striate; umbilicus small, narrow; mouth sub-rotund, entire.

Length .15. Breadth .18 of an inch.

Remarks.—The longitudinal striæ, or lines of growth very frequently do not cross the ribs. The mouth is slightly quadrate. The sculpture is not unlike that of the Acteon globosa, herein described.

This shell may be identical with the D. lyra, Conrad, but its ribs are entire and its aperture is not dilated. It is also much smaller.

D. APERTA, Pl. 36. Fig. 75.

D. testâ rotundato-conicâ, sub-elevatâ, tenui, sulcatâ; spirâ brevi, obtusâ; suturis linearibus; anfractibus tribus, convexis, rapidè crescentibus; sulcis longitudinalibus, minutis, irregularibus, penè obsoletis; anfractu ultimo sub-angulato; basi sub-sulcatâ, umbilico magno, lato, profundo; aperturâ ovato triangulari, integrâ.

Shell rounded-conical, somewhat elevated, thin, sulcate; spire short, obtuse; sutures linear; whorls three, convex, rapidly increasing; sulci longitudinal, minute, irregular, almost obsolete; last whorl sub-angular; base slightly sulcate; umbilicus large, wide, profound; mouth ovately triangular, entire.

Length .05. Breadth .08 of an inch.

Remarks.—The longitudinal sulci are very variable. The apex is almost mamillate. The whorls are very much separated from each other by their convexity and the size of the umbilicus.

This is the most elevated species of the genus that I have met with.

D. NATICOIDES, Pl. 36. Fig. 76.

D. testâ discoideâ, crassissimâ, lævi; spirâ planulatâ; suturis linearibus; anfractibus tribus, convexis; anfractu ultimo maximo, rotundato; basi lævi; umbilico parvo, minimè profundo; aperturâ parvâ, ovatâ; labro supernè valdè incrassatâ.

Shell discoidal, very thick, smooth; spire flattened; sutures linear; whorls three, convex; last whorl very large, rounded; base smooth; umbilicus small, shallow; mouth small, ovate; outer lip very much thickened above.

Length .07. Breadth .12 of an inch.

Remarks.—The last whorl almost covers those of the spire. The surface seems somewhat roughened. The mouth is nearly round.

In general outline, this shell bears a strong resemblance to some species of Natica. In this it differs from all the Delphinulæ I have met with.

FAMILY TURBINIDÆ.

GENUS ROTELLA.

R. SUB-CONICA, Pl. 36. Fig. 77.

R. testâ orbiculari, sub-depressâ, crassâ, lævi; spirâ brevi, obtusâ; suturis linearibus; anfractibus quatuor, planulatis; anfractu ultimo sub-angulato; basi lævi; callo lato, medio crasso; aperturâ ovato-quadratâ; columellâ curvatâ.

Shell orbicular, somewhat depressed, thick, smooth; spire short, obtuse; sutures linear; whorls four, flattened; last whorl sub-angulate; base smooth; callus wide, thick in the middle; mouth ovately quadrate; columella curved.

Length .05. Breadth .07 of an inch.

Remarks.—This little shell has no very striking characteristics, and yet cannot be confounded with any other of its congeners. It is unusually elevated for a Rotella.

R. CARINATA, Pl. 36. Fig. 78.

R. testâ lenticulari, valde depressâ, tenuissimâ, lævi, politâ; spirâ brevissimâ, sub-ovatâ, obtusâ; suturis minimis, linearibus; anfractibus tribus, convexis, supernè planulatis; anfractu ultimo acutè angulato, carinato, basi lævi, politâ; callo parvo; aperturâ transversâ, ovali; columellâ latissimâ, curtâ.

Shell lenticular, very much depressed, very thin, smooth, polished; spire very short, sub-ovate, obtuse; sutures very small, linear; whorls three, convex, flattened above; last whorl acutely angulate, carinate; base smooth, polished; callus small; mouth transverse, oval; columella very wide, short.

Length .04. Breadth .11 of an inch.

Remarks.—The carina on the last whorl is very large. There is a corresponding depression in the interior of the mouth. Occasionally, there is an angulated line near the suture of the last whorl, but this is not a constant character. The carina is rather nearer the apex than the base of the shell. The substance is exceedingly thin, and has somewhat the appearance of ivory. On a front view, the general outline of the shell has a remarkably rhomboidal shape.

I know of no species of Rotella, except the following, which resembles this beautiful little shell.

R. LENTICULARIS, Pl. 36. Fig. 79.

R. testâ lenticulari, depressâ, tenui, lævi, politâ; spirâ brevissimâ, sub-ovatâ, obtusâ; suturis parvis, linearibus; anfractibus quatuor, convexis; anfractu ultimo angulato; basi lævi; callo parvo; aperturâ sub-rotundâ; columellâ latâ, curvatâ.

Shell lenticular, depressed, thin, smooth, polished; spire very short, sub-ovate, obtuse; sutures small, linear; whorls four, convex; last whorl angulate; base smooth; callus small; mouth sub-rotund; columella broad, curved.

Length .04. Breadth .09 of an inch.

Remarks.—The angle on the last whorl is very variable. It sometimes amounts almost to a carina. The mouth is nearly round. The callus is slightly depressed below the surrounding surface.

This shell is, in part, allied to both the preceding species, but differs in the number of whorls, shape of the columella and spire, and the angle on the last whorl. They also differ much in thickness.

R. UMBILICATA, Pl. 36. Fig. 80.

R. testâ orbiculari, valdè depressâ, crassâ, lævi, politâ; spirâ umbilicatâ; anfractibus occultis; anfractu ultimo rotundato, spiram tegente, ad suturam superiorem lineâ parvâ impressâ transversâ; basi lævi; callo magno, tenui, medio depresso; aperturâ rotundâ; columellâ latissimâ, subsulcatâ.

Shell orbicular, very much depressed, thick, smooth, polished; spire umbilicate; whorls concealed; last whorl rounded, covering the spire, with a small impressed transverse line near the superior suture; base smooth; callus large, thin, depressed in the middle; mouth rotund; columella very wide, sub-sulcate.

Length .05. Breadth .10 of an inch.

Remarks.—The columella has a shallow groove in its centre. The mouth is almost round.

This little shell, in general outline, is not unlike the R. nana, Lea, but the peculiar umbilicated spire will at once distinguish them.

This genus is quite rare in a fossil state. I believe that but one, the R. suturalis, has been found in the Tertiary beds of Europe. In this country the species appear to be more numerous.

GENUS TROCHUS.

T. ARMILLUS, Pl. 37. Fig. 81.

T. testâ conicâ, elevatâ, crassiusculâ, imperforatâ, costatâ, striatâ; spirâ conicâ, acuminatâ; suturis minimis; anfractibus quinque, planis; costis transversis, tribus, noduliferis, alternantibus striis minimis; anfractu ultimo acutè angulato, carinato; basi valdè planulato, striis magnis et parvis; aperturâ quadrilaterali.

Shell conical, elevated, rather thick, imperforate, costate, striate; spire conical, acuminate; sutures very small; whorls five, flat; costæ transverse, three, noduliferous, alternating with very small striæ; last whorl acutely angular, carinate; base very much flattened, with large and small striæ; mouth quadrilateral.

Length .15. Breadth .18 of an inch.

Remarks.—The transverse ribs are generally noduliferous, but, in some cases, they are partially or even entirely smooth. The carina, on the last whorl, is always smooth. The striæ which alternate with the ribs are exceedingly small, so as to be invisible except with the aid of a powerful microscope. Those on the base are of various sizes. There are generally two large ones near the columella, and near the periphery, while those between are smaller. The base is unusually flat, and the mouth is quadrangular.

T. conus, Pl. 37. Fig. 82.

T. testâ conicâ, crassâ, umbilicatâ, striatâ; spirâ sub-ovatâ, depressâ, obtusâ, ad apicem lævi; suturis latis, impressis; anfractibus sex, planulatis, ad suturam superiorem subcanaliculatis; striis transversis, impressis, parvis, crebris; anfractu ultimo angulato; basi striatâ; umbilico parvo, valdè profundo, striis duobus marginato; columellâ rectâ; aperturâ quadrilaterali, obliquâ.

Shell conical, thick, umbilicate, striate; spire sub-ovate, depressed, obtuse, smooth near the apex; sutures wide, impressed; whorls six, flattened, sub-canaliculate near the upper suture; striæ transverse, impressed, small, numerous; last whorl angulate; base striate; umbilicus small, very profound, margined with two striæ; columella straight; mouth oblique, quadrilateral.

Length .25. Breadth .35 of an inch.

Remarks.—The striæ of the base are rather larger than those on the upper part of the whorls. They increase as they approach the umbilicus, which is margined by two or three much deeper than the rest. They gradually become obsolete as they approach the apex, which is smooth. The umbilicus is not large, but very deep, so much so, indeed, as, apparently, to extend to the apex of the shell. It is continued downwards in a groove behind the columella. The mouth is nearly rhomboidal.

This species is closely allied to the T. eboreus, Wagner, from the Tertiary of S. Carolina, but the umbilicus and numerous striæ are sufficient to distinguish it.

T. lens, Pl. 37. Fig. 83.

T. testâ lenticulari, infernè et supernè depresso-conicâ, crassiusculâ, politâ, umbilicatâ, striatâ; spirâ brevissimâ, conicâ, minimè obtusâ; suturis latis, sub-profundis; anfractibus quatuor, planulatis, ad suturam superiorem canaliculatis; striis transversis, impressis, parvis, raris; anfractu ultimo acutè angulato, carinato; basi conicâ, striatâ; umbilico parvo, profundo, striis duobus profundis marginato; aperturâ quadrato-ovatâ.

Shell lenticular, depressed-conical above and below, rather thick, polished, umbilicate, striate; spire very short, conical, slightly obtuse; sutures wide, rather deep; whorls four, flattened, canaliculate at the upper sutures; striæ few, transverse, impressed, minute; last whorl acutely angular, carinate; base conical, striate; umbilicus deep, small, margined with two deep striæ; mouth quadrately ovate.

Length .10. Breadth .15 of an inch.

Remarks.—The unusually long base gives the shell the appearance of a double cone. The angle on the last whorl is about half way between the apex and the base. On the whorls of the spire, the striæ are two in number. There are three on the upper part of the last whorl, the lowest of which is the deepest. There is also a rib margining the lower part of the carina, making it appear double. The outer lip appears to be very fragile, as, out of four or five specimens now before me, not one has the mouth perfect. The whorls are perfectly flat, or even sometimes a little concave.

The peculiar lenticular form of this shell will at once distinguish it from all our other fossil species. The only one, indeed, to which it bears any resemblance is the T. reclusus. From this it differs chiefly in size, umbilicus, and columella.

T. TORQUATUS, PL. 37. FIG. 84.

T. testâ conicâ, acuminatâ, crassâ, politâ, perforatâ, crenulato-costatâ; spirâ sub-conicâ, depressiusculâ, obtusâ; suturis parvis; anfractibus quatuor, sub-convexis; costis transversis, quatuor, noduliferis; anfractu ultimo acutè angulato, carinato; basi crebrè et profundè striatâ; perforatione parvâ; aperturâ quadrangulari.

Shell conical, acuminate, thick, polished, perforate, crenulately costate; spire somewhat conical, rather depressed; obtuse; sutures small; whorls four, nearly flat; costæ transverse, four, noduliferous; last whorl acutely angular, carinate; base closely and profoundly striate; perforation small; mouth quadrangular.

Length .13. Breadth .12 of an inch.

Remarks.—The carina on the periphery of the last whorl is round and polished. There are three large, and one small nodulose costæ, the small one being next to the one nearest the upper suture.

This much resembles the T. armillus, herein described, but may be readily distinguished from that shell by its umbilicus, more ovate shape, and more striate base.

T. ARATUS, PL. 37. FIG. 85.

T. testâ ovato-conicâ, crassâ, politâ, imperforatâ, costatâ; spirâ depressâ, sub-ovatâ, obtusâ, ad apicem lævi; suturis parvis, linearibus; anfractibus tribus, sub-convexis; costis transversis, tribus, magnis, sub-noduliferis; anfractu ultimo angulato, costis quatuor; basi sulcatâ; aperturâ rotundâ.

Shell ovately conical, thick, polished, imperforate, costate; spire depressed, sub-ovate, obtuse, smooth near the apex; sutures small, linear; whorls three, slightly convex; costæ transverse, three, large, sub-noduliferous; last whorl angular, with four ribs; base sulcate; mouth round.

Length .08. Breadth .08 of an inch.

Remarks.—In the only specimen of this shell now before me, the two upper ribs are a little nodulous, while the two lower ones are smooth. As this is a variable character, it is probable that they may all be nodulous in other specimens. The additional one on the last whorl is almost large enough to be called a carina. The base is closely and deeply grooved. The mouth is perfectly round.

This shell is somewhat similar to the T. armillus, herein described, but is sufficiently distinguished by its more ovate form and round mouth.

T. RUFFINII, PL. 37. FIG. 86.

T. testâ conicâ, crassâ, costatâ, imperforatâ; spirâ elevatâ; suturis minimis, linearibus; anfractibus ——, infernè carinatis et sulcatis, supernè concavis et costatis; costis transversis, tribus, noduliferis, alternantibus striis minutissimis; anfractu ultimo angulato, bicarinato, carinâ superiore sub-crenulatâ; basi lævi; aperturâ transversâ, quadrilaterali; columellâ rotundatâ, lineâ impressâ marginatâ.

Shell conical, thick, costate, imperforate; spire elevated; sutures very small, linear; whorls ——, carinate and sulcate below, concave and costate above; costæ three, transverse, noduliferous, alternating with very minute striæ; last whorl angular, bicarinate; upper carina sub-crenulate; base smooth; mouth transverse, quadrilateral; columella rounded, margined by an impressed line.

Length ——. Breadth .38 of an inch.

Remarks.—The edge of the last whorl has two carinæ, or perhaps, more strictly speaking, a large carina with a deep groove in its centre. On the superior whorls, the upper carina and groove are alone visible. The transverse striæ are almost invisible to the

naked eye. The base is smooth, with the exception of two or three small striæ, immediately below the periphery of the whorl. As my only specimen is imperfect, I am unable to determine the dimensions or number of whorls.

The smooth base and peculiar rounded columella distinguish this shell from our other tuberculated fossil Trochi, some of which it much resembles.

This pretty little shell was sent to my father from the neighbourhood of Petersburg by E. Ruffin, Esq., whose name I have great pleasure in affixing to it as a slight token of respect for his zeal in elucidating the Geology of Virginia.

GENUS TURBO.

T. GLABER, Pl. 37. Fig. 87.

T. testâ ovato-turbinatâ, elevatâ, tenui, umbilicatâ, lævi, nitente; spirâ elevatâ, rotundatâ; suturis parvis, linearibus; anfractibus ——, valdè convexis; anfractu ultimo rotundato; basi lævi; umbilico parvo; aperturâ ovatâ, supernè angulatâ, infernè rotundatâ; labro acuto.

Shell ovately turbinate, elevated, thin, umbilicate, smooth, polished; spire elevated, rounded; sutures small, linear; whorls ——, very convex; last whorl rounded; base smooth, umbilicus small; mouth ovate, angular above, rounded below; outer lip acute.

Length ——. Breadth .80 of an inch.

Remarks.—The umbilicus is small, and partially covered by an extension of the columella. The surface of the shell is glabrous, but not perfectly smooth, owing to inequalities in the growth, with occasional faint longitudinal lines. The mouth has a small internal channel-like impression where it meets the preceding whorl.

Having but one specimen of this shell, and that imperfect at the apex, I am unable to give its length or number of whorls. Of the latter, a little more than two remain, and about two or three must have been removed.

This shell bears so strong a resemblance to the recent Paludina vivipara, Auct., that were it not found among oceanic shells, I should have little hesitation in considering it as a variety of that species.

This shell is by far the largest of the genus as yet discovered in our Tertiary. It is unusually elevated in the spire for a Turbo.

T. RUSTICUS, Pl. 37. Fig. 88.

T. testâ globoso-conicâ, crassâ, perforatâ, cancellatâ; spirâ conicâ, depressâ, acutâ; suturis parvis, linearibus; anfractibus quinque, planulatis; striis transversis crebris, magnis; striis longitudinalibus crebris, parvis; anfractu ultimo rotundato; basi striatâ transversè et alternatim; perforatione parvâ, angustâ; aperturâ quadrato-rotundatâ.

Shell globosely conical, thick, perforate, cancellate; spire conical, depressed, acutē; sutures small, linear; whorls five, flattened; transverse striæ numerous, large; longitudinal striæ numerous, small; last whorl rounded; base striate transversely and alternately; umbilicus small, narrow; mouth quadrately rounded.

Length .12. Breadth .11 of an inch.

Remarks.—The transverse striæ on the upper part of the last whorl show a slight disposition to be alternate, and on the base they become entirely so. The whorls are sub-canaliculate at the upper sutures. The columella has a very slight incrassation at the base, but not sufficient to constitute the shell a Monadonta. The mouth is angular at the upper part of the columella, and round at the outer lip.

I can find none of our species of Turbo to which this pretty little shell can be referred. With the same number of whorls, it is hardly more than a fourth the size of the T. caperatus, Con., which it in some degree resembles. And, in our species, the transverse striæ are large, almost deserving the appellation of ribs, while in the T. caperatus they are described as small.

FAMILY CANALIFERIDÆ.

GENUS CERITHIUM.

C. CLAVULUS, PL. 37. FIG. 89.

C. testâ turritâ, valdè elevatâ, crassâ, costatâ, striatâ; spirâ acutâ, conicâ, valdè attenuatâ, mâmillatâ; suturis linearibus, sub-obsoletis; anfractibus ——, planis; costis tribus, transversis, magnis, sub-acutis, lævibus; striis longitudinalibus, raris, parvis; anfractu ultimo angulato; basi lævi; aperturâ quadratâ; canali brevi, minimè profundo.

Shell turrited, very elevated, thick, costate, striate; spire acute, conical, very attenuate, mamillate; sutures linear, almost obsolete; whorls ——, flat; ribs three, transverse, large, sub-acute, smooth; striæ longitudinal, small, infrequent; last whorl angular; base smooth; mouth quadrate; canal short, shallow.

Length ——. Breadth .15 of an inch.

Remarks.—The longitudinal striæ, from their size, although they do not cross the ribs, give the shell a cancellated appearance under the microscope. The mouth is nearly square. The body whorl has four instead of three striæ, a very small one being placed immediately below the angle.

This species bears a strong resemblance to the C. terebrale,* Adams, a recent shell from our coast, but it may be distinguished by having the transverse ribs fewer and more acute, the longitudinal striæ less frequent and larger, and the canal longer and less profound. It also approaches the Terebra constricta, Nob., but the ribs are more flattened, and the striæ less numerous and larger.

Although not thin, this shell is extremely fragile, as out of about fifty specimens I have not one full-grown one with the apex perfect. It attains a much larger size than that shown in the figure.

C. CURTUM, PL. 37. FIG. 90.

C. testâ elevato-conicâ, tenui, sub-cancellatâ, carinatâ, sub-perforatâ; spirâ breviusculâ, acutâ, ad apicem lævi; suturis excavatis; anfractibus sex, medio carinatis; striis transversis et sulcis longitudinalibus variabilibus; ultimo anfractu angulato; basi minutè striatâ; perforatione minimâ, aliquando obsoletâ; aperturâ ovatâ, supernè angulatâ, infernè valdè effusâ.

Shell elevated conical, thin, sub-cancellate, carinate, sub-perforate; spire rather short, acute, smooth at the apex; sutures excavated; whorls six, carinate in the middle; transverse striæ and longitudinal sulci variable; last whorl angular; base minutely striate; perforation very small, sometimes obsolete; mouth ovate, angular above, very effuse below.

Length .15. Breadth .06 of an inch.

Remarks.—The longitudinal sulci are very variable, being sometimes almost obsolete, while at others they give the shell a completely cancellate appearance, cutting the striæ

* As the name of this shell has been preoccupied, by Lamarck, for a fossil species from Grignon, I propose that the name of the discoverer be affixed to it, changing it to C. Adamsii. I find also that the name of the C. cancellatum, Nob., has been used by the same author. I, therefore, change it to C. spina.

and carina at right angles. The carina is placed immediately below the middle of the whorls, and, in some specimens, between it and the lower suture is another smaller one. When this latter is not present, it is replaced by a stria. Between the carina and upper suture there are generally two striæ, which vary in size. Those on the base are much smaller than those on the whorls. The sutures are small and triangular.

This shell is unusually short and thick for a Cerithium, and its effuse mouth has hardly the character of the canal of that genus.

C. DÆDALEUM, Pl. 37. Fig. 91.

C. testâ subulatâ, tenui, imperforatâ, costatâ, striatâ; spirâ attenuatâ, sub-ovatâ, mamillatâ, ad apicem lævi et politâ; suturis linearibus, parvis; anfractibus septem, planulatis; costis longitudinalibus, crebris, lævibus, planulatis; striis transversis, crebris, profundis; ultimo anfractu rotundato; basi striatâ, politâ; aperturâ arctatâ, sub-quadratâ, supernè angulatâ, infernè effusâ; labro acuto.

Shell subulate, thin, imperforate, costate, striate; spire attenuate, sub-ovate, mamillate, smooth and polished near the apex; sutures small, linear; whorls seven, flattened; striæ transverse, numerous, deep; costæ longitudinal, numerous, smooth, flattened; last whorl rounded; base striate, polished, mouth narrow, sub-quadrate; angulate above, effuse below; outer lip acute.

Length .15. Breadth .05 of an inch.

Remarks.—The sculpture of this shell is not unlike that of the Pasithea subula, herein described.

With this shell, as with the preceding, I feel in some doubt as to the genus to which it properly belongs.

C. MONILIFERUM, Pl. 37. Fig. 92.

C. testâ subulatâ, sinistrali, crassâ, imperforatâ, costatâ; spirâ attenuatâ, conicâ; suturis minimis; anfractibus decem, planis; costis tribus, transversis, noduliferis, duabus extremis magnis, unâ medio parviore; anfractu ultimo rotundato; basi costis tribus, lævibus, transversis; aperturâ elongato-quadratâ; columellâ lævi, politâ; canale profundo, brevi.

Shell subulate, sinistral, thick, imperforate, costate; spire attenuate, conical; sutures very small; whorls ten, flat; costæ three, transverse, noduliferous, two extreme ones large, the middle one smaller; last whorl rounded; base with three transverse, smooth ribs; mouth elongately quadrate; columella smooth, polished; canal deep, short.

Length .22. Breadth .09 of an inch.

Remarks.—The middle costa is smaller than the two outer ones; it gradually decreases on the upper whorls, and finally becomes obsolete near the apex. The sutures are very small, and the whorls perfectly flat, so that it is difficult to determine their number.

This shell approaches the C. nigrocinctum, Adams, a recent species from our coast, but may be distinguished by its greater proportionate length, flatness of the whorls, and the difference between the size of the ribs. It is also allied to the C. perversum, another recent shell, but it is much smaller, and the ribs are strictly noduliferous, while in the C. perversum, they intersect longitudinal sulci. The three smooth basal costæ constitute another character peculiar, I believe, to this shell.

GENUS PLEUROTOMA.

P. LUNATUM, Pl. 37. Fig. 93.

P. testâ elongato-fusiformi, crassâ, glabrâ, nitente, imperforatâ, costatâ; spirâ attenuatâ, mamillatâ, ad apicem lævi; suturis flexuosis, minimis; anfractibus decem, medio angulatis, infernè convexis et costatis, supernè concavis et

sub-tuberculatis; costis longitudinalibus, sub-obliquis, magnis, rotundatis; anfractu ultimo rotundato; basi striis parvis, longitudinalibus; aperturâ arctato-ovatâ; columellâ rectâ, crassâ, politâ, superne valdè incrassatâ; sino profundo, lunato; canale brevi, inciso.

Shell elongately fusiform, thick, glabrous, shining, imperforate, costate; spire attenuate, mamillate, smooth at the apex; sutures flexuose, very small; whorls ten, angular near the middle, below convex and costate, above concave and subtuberculate; costæ longitudinal, somewhat oblique, large, rounded; last whorl rounded; base with small longitudinal striæ; mouth narrowly ovate; columella straight, thick, polished, very much incrassated above; sinus deep, crescent-shaped; canal short, incised.

Length 1.60. Breadth .50 of an inch.

Remarks.—The upper concave part of the whorls, near the suture, has a series of indistinct tubercles, generally large and but very little elevated. The costæ end a little below the middle of the last whorl, and the base is smooth, with the exception of a few longitudinal raised lines, and an indistinct oblique stria, which marks the growth of the canal. Behind the columella is a small groove, caused by its elevation above the neighbouring surface. The incrassation at the upper extremity of the columella forms a large callus, at the mouth of the sinus, and almost fills it up. This gives it its peculiar lunate appearance. There is, properly speaking, no canal. The base of the mouth is deeply incised, as in the genus Oliva, without cutting off the end of the columella as is usual in this class of shells.

This beautiful species agrees pretty well with the description and figure of P. limatula, Conrad, (Journal of the Academy, Vol. VI.) but is larger, tuberculate near the suture, and has the ribs more strongly developed. In addition to this, Mr. Conrad makes no mention of the peculiar lunate sinus which characterizes the shell now before us.

GENUS FASCIOLARIA.

F. PARVULA, Pl. 37. Fig. 94.

F. testâ fusiformi, crassâ, imperforatâ, nitente, sulcatâ, striatâ; spirâ elevatâ, obtusâ, ad apicem lævi; suturis profundis, arctatis; anfractibus septem, sub-convexis; sulcis longitudinalibus, magnis, crebris; striis transversis, parvis, raris; anfractu ultimo rotundato; basi profundè striatâ; aperturâ longâ, arctatâ, supra acutè angulatâ; columellâ multiplicatâ, canale longo, profundo, sub-curvato.

Shell fusiform, thick, imperforate, shining, sulcate, striate; spire elevated, obtuse, smooth near the apex; sutures deep, narrow; whorls seven, somewhat convex; sulci longitudinal, large, numerous; striæ transverse, small, few; last whorl rounded; base deeply striate; mouth long, narrow, acutely angular above; columella with many folds; canal long, deep, slightly curved.

Length .20. Breadth .08 of an inch.

Remarks.—On the superior whorls there are three small transverse striate near the upper suture, which cross the sulcations. The one nearest the suture is the largest and deepest. On the last whorl the sulcations end about the middle, and then, after a narrow interval, commence deep transverse striæ which increase as they approach the base. The folds on the columella are but continuations of these striæ. The aperture is very narrow and somewhat sinuous, gradually decreasing to the canal. The sutures are quite narrow and deep.

GENUS FUSUS.

F. PYGMÆUS, Pl. 37. Fig. 95.

F. testâ ovatâ, sub-fusiformi, crassâ, lævi, politâ; spirâ ovatâ, valdè obtusâ, breviusculâ; suturis linearibus; anfractibus quatuor, planulatis; anfractu ultimo rotundato; basi lævi; aperturâ sinuosâ, arctatâ; columellâ angulatâ; canale torto, longo.

Shell ovate, somewhat fusiform, thick, smooth, polished; spire ovate, very obtuse, rather short; sutures linear; whorls four, flattened; last whorl rounded; base smooth; mouth sinuose, narrow; columella angled; canal long, twisted.

Length .08. Breadth .05 of an inch.

Remarks.—This minute species is remarkably ovate. The canal is very long, and bent at several places. The apex is obtuse and sub-mamillate.

This shell, most probably, attains a greater size than that mentioned above, as the only specimen in my possession, bears evident marks of having had part of the last whorl broken off. This may also have given it its peculiar twisted canal.

F. ANOMALUS, Pl. 37. Fig. 96.

F. testâ ovatâ, sub-fusiformi, perforatâ, tenui, lævi, politâ; spirâ sub-ovatâ, elevatâ, acutâ; suturis excavatis, latis; anfractibus quinque, convexis; anfractu ultimo rotundato; basi lævi; perforatione parvâ, arctâ; aperturâ sub-ellipticâ; columellâ brevi, tortâ; canale longo, minimè profundo, sinistrorsim reflecto.

Shell ovate, sub-fusiform, perforate, thin, smooth, polished; spire sub-ovate, elevated, acute; sutures excavated, wide; whorls five, convex; last whorl rounded; base smooth; perforation small, narrow; mouth sub-elliptical; columella short, twisted; canal long, very shallow, bent backwards towards the left.

Length .18. Breadth .10 of an inch.

Remarks.—There is a small canaliculation on the whorls near the upper part, which makes the sutures quite wide and deep. The umbilicus is very narrow, and almost hidden behind the columella. The canal is very peculiar, being folded round the base of the columella, until it extends nearly a third round the shell. There are faint traces of transverse striæ to be seen on some parts of the whorls.

It is not without some hesitation that I place this shell among the Fusi. It has not the straight deep canal which usually characterizes that genus, but in other respects it approaches it more nearly than any other. It may, perhaps, prove the type of a new genus.

FAMILY PURPURIDÆ.

GENUS BUCCINUM.

B. Tuomeyi, Pl. 37. Fig. 97.

B. testâ ovato-fusiformi, crassâ, imperforatâ, striatâ; spirâ elevatâ, scalariformi; suturis impressis, profundis; anfractibus ——, sub-convexis, ad suturam superiorem angulatis; striis transversis, duplicatis, parvis, crebris; anfractu ultimo rotundato, infernè striis magnis et parvis alternantibus; basi longitudinaliter sulcatâ; aperturâ quadrangulari; canale longo, retorto; columellâ flexuosâ, infernè plicâ magnâ unâ.

Shell ovately fusiform, thick, imperforate, striate; spire elevated, scalariform; sutures impressed, deep; whorls ——, somewhat convex, angulate at the upper suture; striæ transverse, double, numerous, small; last whorl rounded, with large and small alternating striæ below; base longitudinally sulcate; mouth quadrangular; canal long, retorted; columella flexuose, with one large fold below.

Length ——. Breadth 1.40 inches.

Remarks.—On the upper part of the last whorl the striæ are in pairs with a minute impressed line between them having the appearance of double striæ. These, as they approach the base, pass gradually into alternating ones. The base, immediately behind the lower part of the columella, is marked with deep, somewhat semicircular, sulcations pointing the successive growth of the canal. The upper part of the columella is marked

by faint continuations of the striæ, not entirely obliterated by a thin deposite of callus. The canal is longer than is usual with the Buccina, and is bent somewhat backwards. The columella is much twisted. Close to the upper suture the whorls are bent, first at a right angle, and then downwards, descending gradually to the suture. Near the middle of the whorl, the striæ are faintest. As my only specimen is quite imperfect, I am unable to give the length or number of whorls; of these latter, portions of three remain, and there have probably been three or four more.

This fine shell is the largest of our fossil Buccina. Judging from description, it may bear a distant resemblance to the B. multirugatum, Conrad, but it differs in its straight striæ, size, want of an umbilicus, &c. It is quite rare. Mr. Tuomey whose name I have great pleasure in affixing to it, tells me that he has met with but two specimens of it, both imperfect.

B. PUSILLUM, PL. 37. FIG. 98.

B. testâ ovatâ, sub-conicâ, crassâ, sub-perforatâ, lævi; spirâ ovatâ, brevi, obtusâ; suturis parvis, linearibus; anfractibus quinque, sub-convexis; anfractu ultimo rotundato; basi lævi; perforatione minimâ; aperturâ ovatâ; columellâ rectâ.

Shell ovate, somewhat conical, thick, sub-perforate, smooth; spire ovate, short, obtuse; sutures small, linear; whorls five, slightly convex; last whorl rounded; base smooth; perforation very small; mouth ovate; columella straight.

Length .08. Breadth .04 of an inch.

Remarks.—This little shell bears a strong affinity to the recent B. lunatum, Say, but it is less ovate, and hardly a fifth the size of that shell.

B. FRUMENTUM, PL. 37. FIG. 99.

B. testâ ovato-fusiformi, acuminatâ, crassâ, perforatâ, lævi; spirâ conicâ, elevatâ, obtusâ; suturis parvis, linearibus; anfractibus quinque, convexis; anfractu ultimo rotundato, prope aperturam sub-undulato; basi lævi; perforatione parvâ; aperturâ acuminato ovatâ; canale brevi, obliquo; columellâ tortâ.

Shell ovately fusiform, acuminate, thick, perforate, smooth; spire conical, elevated, obtuse; sutures small, linear; whorls five, convex; last whorl rounded, slightly undulate near the mouth; base smooth; perforation small; mouth acuminate-ovate; canal short, oblique; columella twisted.

Length .15. Breadth .10 of an inch.

Remarks.—The undulations on the last whorl near the aperture are scarcely visible, and may be accidental.

This little shell has no very peculiar characteristics, but I cannot refer it to any described species.

B. QUADRULATUM, PL. 37. FIG. 100.

B. testâ ovato-conicâ, crassâ, imperforatâ, sulcatâ, costatâ; spirâ conicâ, sub-elevatâ, obtusâ, prope apicem lævi et politâ; suturis parvis, flexuosis; anfractibus sex, valdè convexis, prope suturam superiorem pene lævibus; sulcis longitudinalibus, latis, profundis; costis transversis, parvis, quadrangularibus, planulatis; anfractu ultimo rotundato; basi costatâ; aperturâ penè ellipticâ; columellâ curvatâ, truncatâ, infernè plicâ parvâ; canale obliquo.

Shell ovately conical, thick, imperforate, sulcate, costate; spire conical, somewhat elevated, obtuse, smooth and polished near the apex; sutures small, flexuose; whorls six, very convex, nearly smooth at the upper suture; sulci longitudinal, wide, deep; costæ transverse, small, quadrangular, flattened; last whorl rounded; base costate; mouth nearly elliptical; columella curved, truncate, with a small fold below; canal oblique.

Length .20. Breadth .12 of an inch.

Remarks.—The sulcations are unusually wide and close together, rendering the elevations between them acute. The ribs are four in number on the upper whorls, be-

sides a smaller one near the superior suture. They are perfectly quadrangular, having perpendicular sides and a flat top. When they cross the sulcations, they appear slightly nodulous. The spaces between them are about equal to them in width. Those on the base are closer and more acute. About three whorls of the apex are perfectly smooth.

This little species can be readily distinguished from its congeners by the peculiar shape of its transverse ribs.

GENUS NASSA.

N. IMPRESSA, Pl. 37. Fig. 101.

N. testâ elongato-ovatâ, crassâ, imperforatâ, costatâ, striatâ; spirâ attenuatâ, conicâ, obtusâ, prope apicem lævi et politâ; suturis impressis, flexuosis; anfractibus septem, convexis, ad suturam superiorem angulatis; costis longitudinalibus, latis, rotundatis; striis transversis, parvis, flexuosis; anfractu ultimo rotundato; basi striatâ; aperturâ sub-ellipticâ; canale brevi, obliquo; labro intus minutè dentato.

Shell elongately ovate, thick, imperforate, costate, striate; spire attenuate, conical, obtuse, smooth and polished near the apex; sutures impressed, flexuose; whorls seven, convex, angular near the upper suture; costæ longitudinal, wide, rounded; striæ transverse, flexuose, small; last whorl rounded; base striate; mouth sub-elliptical; canal short, oblique; outer lip minutely dentate within.

Length .20. Breadth .11 of an inch.

Remarks.—The transverse striæ are small and abrupt; they cross the ribs. There is one rather deeper than the rest on the angle of the whorls, above this is a very small one, and between this and the suture the surface is smooth. The costæ are very large and wide, generally rounded, but occasionally somewhat angular. The three first whorls of the spire are smooth. There are two or three teeth of various sizes on the inside of the outer lip.

This little shell differs in various respects from all of our other species of Nassa. It is more elevated than is usual with the genus. The striæ are fewer and the costæ larger than in the recent N. alba, Say, to which, in sculpture, it bears some resemblance.

FAMILY COLUMELLIDÆ.

GENUS MARGINELLA.

M. CONULUS, Pl. 37. Fig. 102.

M. testâ obovatâ, conoidali, crassâ, lævi, politâ; spirâ conicâ, obtusâ; suturis sub-obsoletis; anfractibus tribus, planis; anfractu ultimo rotundato; basi lævi; aperturâ longâ, arctatissimâ; columellâ infernè plicis tribus; labro incrassato, rotundato, lævi.

Shell obovate, conoidal, thick, smooth, polished; spire conical, obtuse; sutures nearly obsolete; whorls three, flat; last whorl rounded; base smooth; mouth long, very narrow; columella with three folds near the base; outer lip thickened, rounded, smooth.

Length .12. Breadth .08 of an inch.

Remarks.—The whorls of the spire are very small, and the sutures almost obliterated, so that they can scarcely be seen except on a perpendicular view. The folds on the columella are very near the base, and quite small. The shape of the mouth is almost linear.

This shell is more nearly allied to the M. incurva, Lea, than to any other, but differs in the number of the folds on the columella, and the incrassation of the outer lip.

M. EXILIS, Pl. 37. Fig. 103.

M. testâ acuminato-ellipticâ, compressâ, tenui, lævi, politâ; spirâ attenuatâ, obtusâ, ovatâ; suturis obsoletis; anfractibus——, planis; anfractu ultimo rotundato; basi lævi, acuminatâ; aperturâ angustâ, ovatâ; columellâ plicis quatuor; labro acuto, intus costâ longitudinali.

Shell acuminately elliptical, compressed, thin, smooth, polished; spire attenuate, ovate, obtuse; sutures obsolete; whorls ——, flat; last whorl rounded; base smooth, acuminate; mouth narrow, ovate; columella with four folds; outer lip acute, with a longitudinal costa within.

Length .18. Breadth .10 of an inch.

Remarks.—The spire is covered with a smooth porcelain-like deposite, which obliterates the sutures, and renders it impossible to determine the number of whorls. The most peculiar character about this shell is the internal rib, near the edge of the outer lip.

FAMILY CONVOLUTIDÆ.

GENUS OLIVA.

O. CANALICULATA, Pl. 37. Fig. 104.

O. testâ cylindraceâ, crassâ, lævi, nitidâ; spirâ exsertâ, obtusâ, scalariformi; anfractibus quinque, angulatis, prope suturam inferiorem incrassatis; suturis valdè profundis, latis, canaliculatis; basi acuminatâ, striis raris, parvis, transversis; aperturâ lineari, supernè valdè incisâ, infernè emarginatâ; columellâ multiplicatâ; labro acuto.

Shell cylindrical, thick, smooth, shining; spire exserted, obtuse, scalariform; whorls five, angular, incrassated near the lower suture; sutures very deep, wide, canaliculate; base acuminate, with a few small transverse striæ; mouth linear, deeply incised above, emarginate below; columella with many folds; outer lip acute.

Length 1.60. Breadth .70 of an inch.

Remarks.—The line of incrassation on the lower part of the whorls, is wanting on the last one. To those of the spire, it gives a peculiar bullate appearance. The sutures are larger and deeper than in any other of the genus. The outer lip is attached to the body of the shell only by a small transverse plate, near its upper extremity, which causes the peculiar suture. This plate does not extend to the edge of the lip.

There is a specimen of this shell, without a name, in the collection of the Academy of Natural Sciences of Philadelphia. I am surprised that it has not been heretofore described, as it is a remarkable shell and by no means rare. It has hitherto, I believe, been confounded with one of our recent species, which it distantly resembles.

O. ANCILLARIÆFORMIS, Pl. 37. Fig. 105.

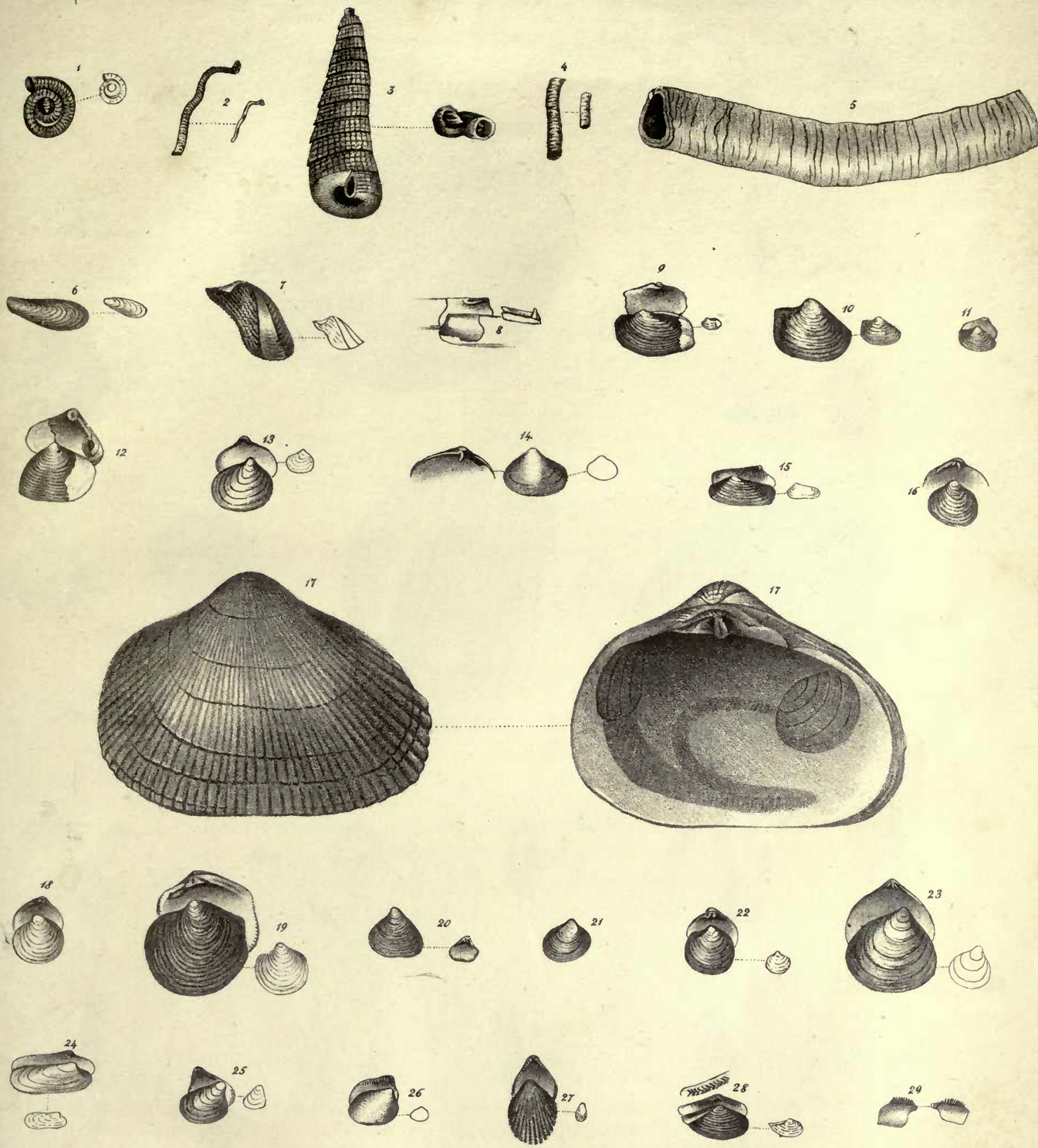
O. testâ ovato-cylindraceâ, tenui, lævi, politâ; spirâ subulatâ; suturis canaliculatis; anfractibus ——, planis; anfractu ultimo rotundato; basi lævi; aperturâ sub-triangulari, effusâ, minimè incisâ; columellâ striis nullis, infernè varicè parvo; labro acuto.

Shell ovate-cylindrical, thin, smooth, polished; spire subulate; sutures canaliculate; whorls ——, flat; last whorl rounded; base smooth; mouth sub-triangular, effuse, very slightly incised; columella with no striæ, a small varix below; outer lip acute.

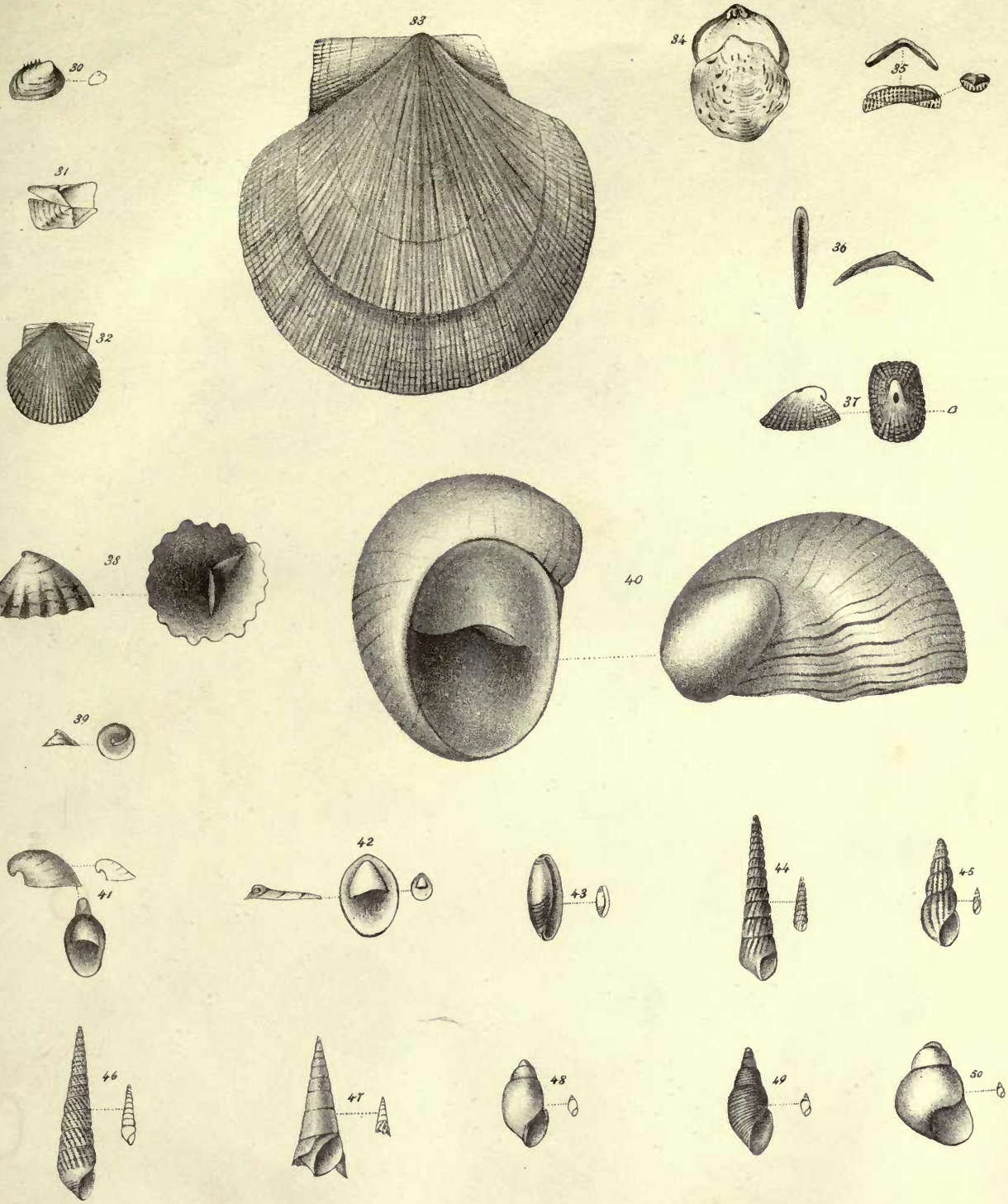
Length .25. Breadth .10 of an inch.

Remarks.—On one of my specimens there is a deep narrow groove immediately below the upper suture. As it exists only on this specimen, and there but at intervals, I suppose it to be merely a fortuitous character. The mouth is acutely angular above and wide below.

The peculiar conformation of the columella and base of the mouth seem to place this shell among the Ancillariæ, but its sutures and naked spire separate it from that genus.



1 *Serpula convoluta*
2 „ *anguina*
3 *Petaloconchus sculpturatus*
4 *Teredo calamus*
5 „ *fistula*
6 *Gastrochæna ligula*
7 *Pholas rhomboidea*
8 *Solen magnodentatus*
9 *Panopæa dubia*
10 *Mya reflexa*
11 *Thracia transversa*
12 *Anatina tellinoides*
13 *Aligena striata*
14 „ *lævis*
15 *Petricola compressa*
16 *Psammocola lucinoides*
17 „ *regia*
18 *Lucina punctulata*
19 „ *lens*
20 *Astarte lineolata*
21 *Cytherea elevata*
22 „ *sphærica*
23 *Venus asoia*
24 *Hiatella lancea*
25 *Nucula delabella*
26 „ *diaphana*
27 „ *æquilatera*
28 „ *carinata*
29 „ *acutidens*



30. *Modiola spinigera*
31. *Avicula multangula*
32. *Pecten micropleura*
33. " *tenuis*
34. *Plicatula rudis*
35. *Chiton transenna*
36. *Patella acinaces*
37. *Cemoria oblonga*
38. *Calyptræa pileolus*
39. *Infundibulum concentricum*
40. *Crepidula ponderosa*
41. " *cornucopiæ*
42. " *lamina*
43. *Bulla cylindrus*
44. *Pasithea exarata*
45. " *subula*
46. " *eburnea*
47. " *lævigata*
48. " *ovulum*
49. " *diaphana*
50. " *turbinopsis*

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51 *Natica apertus.*
52 „ *sphærulus*
53 „ *crassilabrum*
54 *Actæon granulatus*
55 „ *globosus*
56 „ *turbinatus*
57 „ *angulatus*
58 „ *glans*
59 „ *soulptus*
60 „ *nitens*

61 *Actæon milium*
62 „ *simplex*
63 *Pyramidella suturalis*
64 „ *elaborata*
65 *Scalaria acicula*
66 *cornigera*
67 *micropleura*
68 *microstoma*
69 *Delphinula costulata*
70 „ *concava*

71 *Delphinula lipara*
72 „ *oblique-striata*
73 „ *trochiformis*
74 „ *globulus*
75 „ *aperta*
76 „ *naticordes*
77 *Rotella subconica*
78 „ *carinata*
79 „ *lenticularis*
80 „ *umbilicata*

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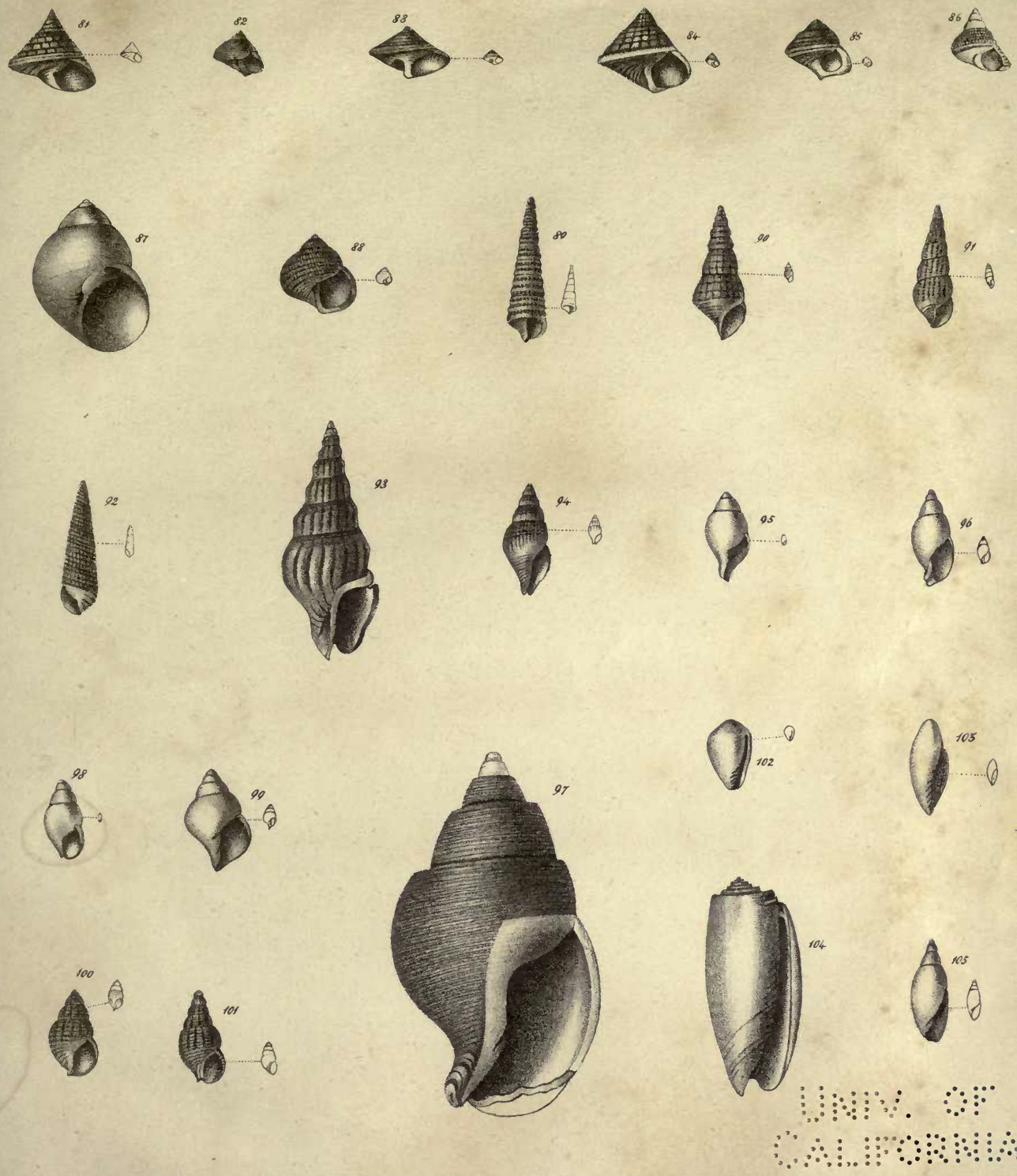

UNIV. OF CALIFORNIA

81 *Trochus armillus*
82 „ *conus*
83 „ *lens*
84 „ *torquatus*
85 „ *aratus*
86 „ *Ruffinii*
87 *Turbo glaber*
88 „ *rusticus*
89 *Cerithium clavulus*
90 „ *curtum*
91 „ *Dædaleum*
92 „ *moniliferum*
93 *Pleurotoma lunatum*
94 *Fasciolaria parvula*
95 *Fusus pygmæus*
96 „ *anomalus*
97 *Buccinum Tuomeyi*
98 *Bucanum pusillum*
99 „ *frumentum*
100 „ *quadrulatum*
101 *Nassa impressa*
102 *Marginella conulus*
103 „ *exilis*
104 *Oliva canaliculata*
105 „ *ancillariæformis*

H. C. Lea. del

T. Sinclair's Lith. Philad.

MODERNE

NOMENCLATURE

DES COQUILLES

DES

GASTÉROPODES ET DES PÉLÉCYPODES

PAR

LE MARQ.^{S} ANTOINE DE GREGORIO

DR. EN SC. NAT.

Avec 1 pl.

PALERME
IMPRIMERIE DU JOURNAL *TEMPO*
DIRIGÉE PAR PIERRE MONTAINA
JUILLET 1883.

ACAD: NAT: SC

ANTOINE DE GREGORIO
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MODERNE NOMENCLATURE
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PALERME, JUILLET 1883.

PRÉFACE.

Comme le nombre des espèces connues se multiplie toujours et en même temps les limites qui les séparent vont s'effaçant, naturellement s'accroit aussi le besoin d'en donner non seulement des figures, qui soient executées avec le plus grand soin, mais des descriptions les plus exactes et minutieuses que possible. À ce but ce qu'il faut avant tout c'est de pouvoir disposer d' une nomenclature qui soit claire et simple, mais qui se prête à décrire les espèces dans tous leurs details, dans toutes leures nuances. Actuelment beaucoup de mots ont un sens équivoque, d'autre un sens different selon on les emploie, et selon les diverses langues. Pour formuler une terminologie bien définie et bien compréhensible, je pense de résumer dans le tableau suivant ce que regarde la nomenclature des coquilles (exclus les céphalopodes, et les brachiopodes) avec toutes les nouveautés actuelment introduites dans la science et toutes les autres que je crois util d' y entroduir, plusieures desquelles j'ai déja proposé (Préface à la Faune Éocénique de S. J. Ilarion etc.), adopté en suite dans mes traveaux paléontologiques. Je dois averfir que je ne m' occupe pas ici de mollusques vivants, mais seulement de fossils; il n'est pas ainsi objet de mon étude tout ce que par la fossilization se détruit. D'ailleurs les études d'aujourd'hui sur la valeur morphologique de la coquille ne reconnaissent plus en elle une simple sécrétion du manteau mais une partie essentielle du corp de l'animal (1). De chaque mot je tache de donner l' équivalent dans les langues latine, allemande, anglaise et italienne. Les mots nouveaux sont imprimés en italique.

(1) Cattaneo, Le colonie lineari e la Morfologia dei molluschi.

ORNEMENTS DES COQUILLES

Ordinairement on use les mêmes mots pour les ornements (verzierungen al.) sculptés et les colorés; je crois qu'il est très nouisible non seulement de mêler ces mots, mais aussi de confondre la sculpture en relief et celle gravée.

J'ai adoptè et je propose les mots suivants.

	pour les ornements en relief	pour les ornements gravés	pour les ornements colorés
	Côtes, plis etc.	Canalicules, cannelures	Bandes, fascies
	Cordonnets, cordelettes, selon la forme et la dimension	Sillons	Bandelettes, listes, traits
	Filets	Stries	Raies
	Lignes	Stries linéaires	Linéoles
	Tubercules	Fossettes	Taches
	Granules	Fossettes granulaires	Taches granulaires
	Lamelles	Sillons ou stries lamellaires selon la dimension	Bandelettes, traits ou raies lamellaires selon la dimension
Les mêmes en italien et en latin	Coste, costule, pieghe (Costae, costulae, plicae selon la f.me et la dim.n)	Canaliculi, scanalature etc. (Canaliculi)	Zone (Zonae)
	Funiculi (Funiculi, resticulae s.la dim.)	Solchi (Sulci, sulculi selon la dim.n)	Liste, tratti (Vittae, fasciolae, tractus)
	Fili (Fila)	Strie (Striae)	Righe (Versus)
	Linee (Lineae)	Strie lineari (Striae lineares)	Lineole (Lineolae)
	Tuberculi, noduli (Tubercula)	Fossette (Foveolae, fossulae)	Macchie (Maculae)
	Granuli (Granula)	Fossettine (Foveolae granulares)	Macchiette (Maculae granulares etc.)
	Lamelle (Lamellae)	Solchi lamellari (Sulci lamellares)	Liste lamellari (Tractus lamellares)
	Lamellule (Lamellulae)	Strie lamellari (Striae lamellares)	Righe lamellari (Versus lamellares)
Les mêmes en angl. et en allem.	Ribs (Rippen), folds (Falten)	Grooves, flutings, chamferings (Hohlkehlen)	Bands (Binden)
	Strings (Stricks, Schnüre)	Ridges, furrows (Furchen)	Stripes ou trails (Leisten, Pinselstriche)
	Threads (Fäden), little strings (Strickchen, Leinchen)	Striatures, striae, sereatchs (Streife)	Streaks (Zeilen)
	Lines (Linien)	Linear furrows (Linienstreife)	Linear streaks (Linienzeilen)
	Tubercles, nodules (Beulen, Knoten)	Ditchs (Gräber, gruben)	Spots (Flecke)
	Granules (Körner)	Dimples (Kleine gruben)	Granular spots (Kornflecke)
	Lamelles (Platten ou Lamelle)	Lamellar ridges or furrows (Plattenförmige Furchen etc.)	Lamellar stripes ou streaks (Plattenförmige zeilen etc.)

De ces mots se forment les adjectifs p.ex. tuberculeux fr., tuberculosus lat., tuberculoso it. etc. et les verbs avec les participes respectifs p. ex. lamellé fr., lamellatus lat., lamellato it.— costatus lat., costated, ribed angl., gerippt al. — dente fr., dentatus lat., gezähnelt al. — strié fr., gestreift al., striato it., striated angl. — funiculatus lat. etc. etc.

Presque touts les auteurs, même les plus éminents, confondent ces mots. Par exemple ils ne font jamais difference entre stries et lignes, sillons et *enrues* = *reliefs des sillons* (*porcae* lat., *porce* ou *relievi* dei solchi it., furrows' *reliefs* angl., der Furchen *reliefe* al.). — Je crois d'ailleurs qu'il serait util d'user les mots latins (qui sont généralement compris et dont le sens ne varie guère) en modifiant leur desinence selon les langues (p. ex. costules, granules, etc. franç., costule, granuli etc. it.....)

Pour indiquer la direction des ornements dans les bivalves j'adopte (comme les malacologistes modernes plus renommés) les mots « radial (ou rayonnant) et concentrique » (radiating, concentrical angl. , radiato , concentrico it., radial , concentrisch al.) et jamais les anciens mots transverse et longitudinal. Ainsi en décrivant les gastéropodes, au lieu de « supérieur et inférieur » (mots équivoques), je dis toujours « antérieur et postérieur » (vorder et hinter al., anterior et posterior angl. et lat., anticus et posticus lat., anteriore et posteriore it.).

Coté antérieur d'une coquille bivalve est celui où se trouve la lunule; postérieur celui du corselet et du sinus palléal (pour quelque auteur ancien comme Born etc. le mot antérieur repond au notre postérieur). Généralement les crochets regardent le coté antérieur, qui est moins developpé du postérieur. — Il est très util d'immaginer une personne qui soit couchée sur le bord cardinal d'une coquille avec les yeux de face à la lunule, et les pieds au corselet ou au sinus palléal. Elle aura ainsi à droite la valve droite, à gauche la gauche, antérieurement le coté antérieur , postérieurement le coté posterieur. On doit généralement préferer ces mots (valva droite et gauche) aux anciens valve supérieure, valve inférieure (obershale, untershale al.). Généralement dans les coquilles inéquivalves celle qui se devoloppe davantage, et qui est plus souvent parassitique , c'est la valve droite (Chama, Ostrea etc.).

Coté antérieur d'une coquille gastéropode est celui qui est plus voicin de l'ouverture et du canal; postérieur celui qui regarde la spire et son sommet.

Pour les gastéropodes au lieu du mot « transverse » de Deshayes (quer al., trasverso it., transverse angl.) je me sers de « spiral » qui a été adopté géneralement par tous les auteurs modernes. Au mot longitudinal il y a longtemps que j'ai, substitué dans tous mes ouvrages le mot *axial* (franç., al. et angl.), *axialis* ou *axilalis* lat., *assiale* ou *assilare* ital. etc., dont *axialement* (franç.), *axially* (angl.), *axialich* (al.), *axialiter* ou *axilariter* (lat.), *assialmente* ou *assilarmente* (ital.) au lieu de l'ancien longitudinalement (langs al., longitudinaliter lat., longitudinalmente it., longi-

tudinally angl.). Cette importante nouveauté a été proposée pour la première fois dans la préface de mon ouvrage sur la Faune éocénique de S. J. Ilarion, où j' en ai exposé les raisons : Le mot longitudinal est maintemant usé en double sens. Les paléontologues, qui étudient de préférence les céphalopodes, le prennent dans le sens de « spiral.» D' autres pour éviter des équivoques décrivent non la coquille dans son ensemble, mais dans ses tours et il les disent p. e. costulés transversement (longitudinalement de Deshayes). Le mot radial que certains auteurs ont usé récemment en substitution de longitudinal aurait l' avantage d'avoir été deja usé dans la science, (dans la nomenclature des lamellibranches), mais son sens reste aussi obscur que celui de longitudinal, parceque si on pourrait l'user pour les coquilles coniques et avec des côtes en séries rayonnantes, on ne le pourrait pas user pour les espèces cylindriques, et avec des côtes irrégulières. Les mots longitudinal et transversal on peut les user seulement pour les ornements des vermetus, dentalium etc. c'est à dire pour les coquilles des gastéropodes cylindriques et non enroulées. Le mot radial pour les bases applaties des trochus, solarium etc.

Le mot « axial » ôte tout équivoque. C'est pour ça qu'il a eu l'approbation de plusieurs éminents malacologues et paléontolognes; il suffit de mentionner les noms de Fischer et de Zittel.

Je dis que les côtes sont « obliques » (schräg al.) lorsqu' elles font un angle de presque 45° avec l'axe columellaire; *oblique-axiales* lorsqu'elles font un angle mineur, *oblique-spirales* lorsqu'elles font un angle majeur: On dit une coquille « argute costata » lat. lorsque ses côtes sont denses, petites, saillantes, tranchantes

« Cingulus » (lat.) = cingolo it. c'est un nom vague qui indique une prominence spirale dans les gastéropodes, radiale dans les bivalves, qui peut être granuleuse, crénelée etc. Il repond à peu près au mot « ceinture » (gürtel al., girdle, cincture angl.).

« Carina » lat. (carène fr., keel angl., carena it., kiel al.) c'es une prominence spirale la plus saillante des tours. Comme dans les « lamelles » etc. des bivalves on distingue la face ventrale, la face umbonale et le bord, ainsi dans les carènes, les côtes etc. des gastéropodes on étudie la face antérieure, la postérieure et le bord ou l'arête s'elles sont aigues.

« Lamella » lat. et it. est un diminutif de lamina ; d' où costae laminares, costae lamellares lat. selon l'épaisseur et la dimension. Les adjectifs « laminaire, lamellaire » souvent se prennent pour lamineforme, lamelleforme (p. ex. raie lamellaire).

« Rayon » = raggio it., ray angl., strahl al., radius lat. est un nom vague qui indique dans les bivalves une zone, une linéole, une cannelure, une côte etc. rayonnante; on peut ainsi user pour les orne-

ments colorés, gravés et en relief. On l'use aussi pour les ornements des bases applaties des gastéropodes p. e. pour celle de certaines solarium, trochus etc.

« Étranglement »=strangolamento it., erdrossellung al., strangulatio lat., strangulation angl. signifie une forte compression latérale, généralement spirale dans les gast. (Triton lotorium L. Buccinum callosum Wood etc.), radiale dans les pelec. (Psammobia, Axinus etc.).

« Nacre » = margarita (selon Lea), nacre, mother of pearl angl., perlmutter al., madreperla, strato madreperlaceo it., margarita lat.

« Lira » (lat.) est aussi un mot très vague qui indique des côtes spirales ou axiales, lisses, pas larges, saillantes, mais non aigues, généralement sublamellaires (p. ex. celles des Harpa, du fusus scalarinus etc.).

« Crénulation » = crenulatio lat., crenulazione it., c'est une espéce de petite dentelure à bord indecis et comme pincé; de très petits tubercules aigus et latéralement pressés. — Crenelé = crenulatus lat., crenulato it., crenulated angl.

« Échancrure » = incisura lat., smarginatura, intaccatura it., einkerbung al., notch angl.

« Rostrum » lat. On appelle ainsi l'estremité tordue et pointue du canal de certaines Rostellaria, et généralement on dit qu'une coquille est « rostrata lat. » lorsqu' elle se termine avec une espéce de bec. Le mot rostrum change de sens selon les espéces: celui d'une alaria est bien different de celui d'un cypraea. Les anciens appellaient rostrum indistinctement le canal antérieur.

« Rangée » = reihe al., row angl., fila it.

« Angle » = angolo it, angulus lat., angle, corner angl, winkel, ecke al.

« Milieu »=mezzo it., dimidium lat, middle angl., mitte, hälfte al.

« Bord » = orlo, bordo it., rand al, edge angl. On appelle ainsi l'estremité linéaire d'une partie d'une coquille. Le mot margo lat. (margine it., margin angl) comprend le bord et la partie extrême toût près de lui. Ces mots auraient ainsi un sens un peu divers; mais dans l'usage souvent se confondent. V. expl. fig. 12.

« Interstices » = interstitia lat., interstices angl., interstizii it., zwischenräume al. Il est très interessant d'étudier leur dimension, s'il sont p. ex. 1/2 des côtes, ou 1/3 etc. et leur ornements. Ceux-ci en effet presque toujours sont oblitérés dans le croisement (si la coquille est « clathrata »), dans l'intersection (si la coquille est « decussata »).

« Seriatim » lat. signifie disposé par series, biseriatim en deux series (p. e. les varices des ranella), triseriatim etc.

« Varice » = varice it, varix lat. et angl., Mundwulst al. (quelque auteur allemand l'appelle Querwulst, quelqu'autre Langswulst,

je crois qu'il serait mieux de l'appeller *Axialwulst* ou même *Krampfader*).

Selon mon opinion les « varices » dans les gastéropodes jouent un rôle plus important qu'on ne le croit. Elles supposent en effet que le développement organique se fait par intervaux, et elles servent non seulement pour augmenter la solidité de la coquille, mais aussi comme une réservoir de substance calcaire, qui puisse être employée en suite par l'animal dans la construction d'une nouvelle partie de la coquille. En effet il n'est par rare, qu'elles soient absorbées de nouveau. Ainsi je distingue et j'étudie dans les gastéropodes variqueux l'état *incubant* (dedié à la construction des varices) et l'état *évolvant* (dedié a le développement des tours). Les vraies varices se trouvent chez les Cassis, Tiphis, Murex, Triton etc. les côtes variqueuses chez certains Fusus, Diastoma, Cerithium etc.

« Sub » est une precieuse préposition avec la quelle on modère le sens des adjectifs p. ex. subfusiformis lat., subfusiforme it. etc. et des verbs p. ex. suballongé etc.

« Imbricé » adj.= imbricatus lat., imbricato it., imbricated angl., gedachsteinen al. On le dit des ecailles etc., concaves et en petites voûtes.

« Malleatus, malleolatus » lat. = martellato it. on le dit des coquilles avec la surface comme martelée ou parsemée de petites martelages.

« Treillissé » = clathratus, reticulalus lat., grated, graticulated angl., clatrato, ingraticolato, reticolato it., vergittert al. Je distingue clathratus de decussatus : Lorsqu' il y a des filets spirals et axials réguliers qui forment une espéce de raiseau (reticella it., reticulum lat.), je dis la coquilles « clathrata. » Mais lorsque il y a p. ex. des filets spirals et des stries axiales régulières qui les coupent en travers je dis que la surface de la coquille est « decussata » lat. et. it. Dans le premier cas si les filets spirals se superposent aux axials, on dit qu'ils passent sur eux « super eos decurrentes ». S'ils ne font pas ça on dit qu' ils décourrent seulement dans les interstices.

« Obliteré, cancellé »= obsoletus lat., obsoleto, obliterato, cancellato it., canceled, obliterated angl., ausgestrichen al.

« Imbricé » = imbricatus lat., imbricato it., imbricated angl., gedachsteinen al. = avec les ornements (écailles, lamelles etc.) disposés les uns sur les autres comme les tuiles.

« Scrobiculatus » lat.= avec la surface parsemée de cicatrices ou de fossettes.

« Fornicatus » lat.= on le dit des écailles etc. qui sont concaves au dedans et en petites voûtes.

« Repandus » lat. = replié en dessus ou en avant, et élargi.

« Emoussé » = smussato it., blunted angl., abgestumpft al.

« Obovatus » lat. = ovalaire renflé en avant.

« Regulier »=regularis lat., einrichten al., regular angl., regolare it. est un adjectif beaucoup usé pour les ornements des coquilles disposés avec ordre et symétrie.

« Muticus » lat. = mutico it. On dit ainsi une coquille avec des côtes, ou des tubercules etc. qui semblerait devoir être épineuse, mais qui ne l'est pas.

bigarré	franç.	aspersus	lat.	screziato	it.	checkred	angl.	scheckig	al.
tacheté	»	maculatus	»	macchiato	»	stained	»	flerkig	»
dense,	»	confertus	»	denso	»	dense	»	dicht	»
dilaté	»	dilatatus	»	dilatato	»	dilated	»	erweitert	»
ovalaire	»	ovoidalis	»	ovolare	»	eggshaped,ovolar	»	eiförmis	»
orbiculaire	»	orbicularis	»	orbicolare	»	orbicular	»	kreiserförmig	»
turgide	»	turgidus	»	turgido	»	inflated	»	angeschwollen	»
moniliphère	»	moniliferus	»	monilifero	»	monilipher	»	perlschnurartig	»
ventru	»	ventricosus	»	ventricoso	»	bigbellied, ventricose	»	bauchig	»
droit	»	rectus	»	dritto	»	straight	»	gerade	»
pliforme	»	pliciformis	»	pieghiforme	»	foldshaped	»	faltenartig	»
retreci	»	coaretatus	»	ristretto	»	restrained	»	verengt	»
obtus	»	obtusus	»	ottuso	»	obtuse, blunt	»	stumpf	»
subtil, fin	»	subtilis	»	sottile	»	thin	»	dünn	»
raccourci	»	contractus	»	raccorciato	»	contracted	»	abgestutzt	»
mince, faible	»	tenuis	»	debole, tenue	»	slender	»	schwag	»
lisse	»	laevigatus	»	liscio	»	smooth	»	glatt	»
epineux	»	spinosus	»	spinoso	»	thorny	»	dornig, staehelig	»
carré	»	quadratus	»	quadrato	»	square	»	viereckig	»
quadrangulaire	»	quadrangulus	»	quadrangolare	»	quadrangular	»	vierwinkelig	»
court	»	curtus	»	corto	»	short	»	kurz	»
allongé	»	elongatus,productus	»	allungato	»	elongated, produced	»	geverlängt	»
ouvert	»	patulus	»	aperto	»	open	»	offen	»
rond	»	rotundus, teres	»	rotondo	»	round	»	rund	»
concave	»	concavus	»	concavo	»	concave	»	hohl	»
convexe,bombé	»	convexus	»	convesso	»	convex	»	runderhaben	»
aigu	»	acutus	»	acuto	»	sharp	»	scharf	»
tordu	»	contortus	»	contorto	»	twisted	»	geverdeht	»
trapezoïde	»	trapeziformis	»	trapezoidale	»	trapeziform	»	trapezförmig	»
courbé	»	curvus	»	curvo	»	curved	»	gebogen	»
cambré	»	arcuatus	»	arcuato	»	cambered	»	gewölbt	»
nombreux	»	memerosus	»	numeroso	»	numerous	»	zahlreich	»
étroit	»	angustus	»	stretto	»	narrow	»	enge	»
large	»	latus	»	largo	»	broad	»	breit	»
puissant	»	validus	»	potente	»	powerful	»	kräftig	»
fort	»	fortis	»	forte	»	strong	»	stark	»
anguleux	»	angulosus	»	angoloso	»	angulous	»	kantig	»
tronqué	»	amputatus	»	troncato	»	truncated	»	abgeschnitten	»
interrompu	»	interruptus	»	interrotto	»	interrupted	»	unterbrochen	»
comprimé	»	compressus	»	compresso	»	compressed	»	zusammengedrückt	»
divariente	»	divaricato	»	divaricato	»	divaricated	»	abweichend	»
divergent	»	divergens	»	divergente	»	divergent	»	divergirend	»
etc.		etc.		etc.		etc.		etc.	

COQUILLES DES PÉLÉCYPODES

(BIVALVES, LAMELLIBRANCHES, ACEPHALES ETC....)

La coquille des bivalves peut être équivalve (gleichklappig al.) ou inéquivalve (ungleichklappig al.), équilaterale (gleichseitig al.) ou inéquilatérale (ungleichseitig al.), ventrue, trigone, allongée, ovalaire, soleniforme (très allongée, étroite, subcylindrique), baillante (hians lat., klaffend al., gaping angl., iante, sbadigliante it.) p. e celle des

Amusium. On appelle hiatus lat., gähnen al., gape angl., iato, sbadiglio it., le baillement fr.) déprimée, en coeur ou coeurforme (heart-shaped angl., cordata lat. et it., cuoriforme it., herzförmig al.), lamellée etc. etc.

Fig. 1.

VALVE DROITE D'UN PECTEN VUE DU DOS

AVEC QUELQUE STRIE RADIALE ET CONCENTRIQUE

ABC Oreillette (Auricula lat., Orecchietta it., Ohr al., Auricle, ear angl.) antérieure.
AB Son bord cardinal.
BC » » *extérieur.*
AC » » *umbonal* (= auriculaire antérieur du crochet).
ABC Son angle *extrême* = *extremus* lat., *estremo* it., ässerstal-extreme angl.
BCA » » *contrumbonal.*
BAC » » *umbonal.*

BCD Angle *extrauriculaire* antérieur = *extrauricularis* lat., *estrauricolàre* it.

CD Bord *antécardinal.*
DEF » antérieur (Vorderrand al., margine anteriore it., anterior margin angl., Wood l'appelle « pedilateral margin »), D son angle, dont la position change selon les espèces et les genres; il se trouve souvent en E, mais non dans les pecten.
FGH » ventral (Ventralrand al.), G son angle.
HKL » postérieur (Hinterrand al., margine posteriore it., posterior margin angl., Wood l'appelle « siphonilateral margin »), L son angle.
LM » *postcardinal.*
ANM Oreillette postérieure.
MN Son bord extérieur.
MA » » umbonal (= auriculaire postérieur du crochet).
NA » » cardinal.
AMN » angle *contrumbonal.*
NAM » » *umbonal.*
MNA » » *extrême.*

LMN Angle *extrauriculaire* postérieur.
MAC » *extrumbonal* = apical ou apicial.
NAB Bord cardinal (Margo cardinalis lat., Schlossrand al., Margine ou bordo cardinale it., Hinge margin angl.).

P Région antérieure (Vorderseite al.).
O » postérieure (Hinterseite al.).
Q » ventrale (Ventralseite al.).
R » dorsale.
S » umbonale.
MACS Crochet (Beak, umbo angl., Umbo lat., Wirbel, Buckel al., umbone it., umbones, nates lat. dans le plur.).

Fig. 2.

VALVE DROITE VUE DE LA FACE INTÉRIEURE.

A Fossette (foveola lat. et it., fossetta it.) du ligament (Bandgrube al., ligament pit angl.).
HB Longueur du bord cardinal de la valve droite.
FD Diamètre *antéropostérieur* de la valve droite
AE » *umboventral* » » »

Anciennement on appellait FD longeur de la coquille, et AE largeur. Comme souvent AE devient plus long que FD pour éviter cette amphilologie on appelle maintenant FD « longeur » (Länge al., lunghezza it., length angl.), et AE largeur (Höhe al., altezza it., height angl.). Mais je ne crois pas qu'on puisse éviter ainsi l'equivoque, lorsque AE est assez plus long que FD. D'ailleurs le mot hauteur suppose que toutes les coquilles se promènent avec le bord ventral en haut. C'est un retour à l'ancien superieur et inférieur ! Au contraire en disant « diamètre antéropostérieur » ou même « longeur antéropostérieure » (*vorderhinterer* Durchmesser, ou *vorderhintere* Länge al., diametro ou lunghezza *anteroposteriore* it, *anteroposterior* ou *before-behind* diameter ou length angl, *anteroposterior* diametrus ou longitudo lat.), « diamètre umboventral » ou même « longeur umboventrale »(*virb el-ventrale* Durchmesser ou Länge al., diametro ou lunghezza *umboventrale* it., *umboventral* diameter ou *beak-ventral* length angl., *umboventralis* diametrus ou longitudo lat.) il n'y aura plus aucun doute dans l'interpretation. Lea et quelqu'autre appellent « breadth » FD, et « lenght » AE !

L Fulcrum antérieur de la valve droite
K » postérieur » » »
} (Stützen al., fulcri it., fulcra lat.). Généralement ils sont appellées dents, mais je ne crois pa ce titre fort approprié.

BTC Sinus de (bord externe de) l'oreillette antérieure (byssal sinus angl., seno dell'orecchietta anteriore it.).

TAGON Région umbonale.
TNOGMQPC » médiane.
CPQMDEFC » peripherique. } Pour la face interne et pour l'externe.
TG Longeur *parauriculaire*.

Ce qu'on a dit a propos de la valve droite vaut aussi pour la gauche.

Fig. 3.

COQUILLE A VALVES FERMÉES.

GC Convexité de la valve (valva it. et lat., valve angl., klappe al.) droite = diamètre *sectional* de la même.
KG » de la valve gauche = diamètre *sectional* de la même.
KC Diamètre sectional de la valve droite = convexité ou épaisseur de la même valve.
KG » » de la valve gauche = convexité ou épaisseur de la même valve.
GC » *bisectional*=épaisseur totale (Dicke al., thickness angl., spessore it.). = Diametro *bisezionale* it.. D. *bisectionalis* lat. etc.
EAB Angle *sectumbonal* de la valve droite.
EAH » » » » gauche.
BAH Angle *bisectumbonal*.
DEA » *sectuventral* de la valve droite.
FEA » » » » gauche
DEF » *bisectuventral*
ABGDE Longeur *zonal-umboventrale* de la valve droite.
AHCFE » » » » » gauche.

J'appelle ainsi longeur *zonal-antéropostérieure* la distance superficielle QB (fig. 5, 7); DEFA, DCBA (fig. 9).

Fig. 4.

VALVE DROITE D'UN CYTHEREA VUE DU COTÉ INTERNE.

H Impression musculaire antérieure } muscular scars, muscular impressions ou cicatrices
A » » postérieure } angl., muskeleindrücke al., impressioni muscolari it.

Dans les coquilles où il y en a une seulement (p. ex. dans les peignes) elle est généralement située dans le coté postérieur. Ceci, lorsqu'il y a des doutes, aide à reconnaître si c'est une valve droite ou une valve gauche. Généralement dans les bivalves il y a deux impressions musculaires, l'une antérieure, l'autre postérieure; dans le genre Unio il y en a presque toujours non

moins de trois ; celle qui est située tout près du dent cardinal est appellée par Lea « dorsal cicatrix » par Wood « pedal scar ». Dans les Unio où il y en a plusieures, celle qui est située dans la cavité umbonale antérieure est appellée par Lea « ventral cicatrix » (Unio trapezoides).

BCDEFG Impression palléale (pallial scar angl., impronta palleale it., Manteleindruck al.). Dans quelque rare espéce elle est double (Unio lacrymosus Lea). Dans quelque autre elle a des vraies impressions musculaires (mya, panopaca). Il y a des auteurs qui font une difference entre impression palléale et ligne palléale (Mantellinie al., linea palleale it., pallial line angl.): Avec la première expression ils dénotent l'espace palléal, avec la seconde sa ligne de démarcation et de délimitation.

BCD Sinus palléal (pallial sinus ou siphonal impression angl., seno palleale it., Mantelbucht al.) dont il est utile de déterminer la direction et l'ouverture. Pour en déterminer la direction j'étudie le prolongement de sa diagonale p. e. s'elle est dirigée au dent accessoir, ou à l'impression musculaire postérieure, ou au dent cardinal etc. Pour en déterminer l'ouverture j'en mesure les degrés avec le goniomètre.

CDE *Promontoire* palléal = lenguette palléale (*Caput* palleale lat., *promontorio* palleale it., pallial promontory angl., *Vorgebirge* ou *landspitze* al.). On l'étudie à la même façon que le sinus.

GF Partie antérieure de l'impression palléale.

FE » ventrale ou médiane idem. Les lettres FE dans la figure devraient être un peu plus écartées.

ED » postérieure idem.

STUV Charnière = hinge angl., cardo lat, cerniera it., schloss al. (on l'appelle plus rarement lame ou cloison cardinal, lorsque on veut indiquer particuliérement le petit planchet qui soutient les dents = hinge plate angl., schlossplatte al., lamina cardinale it.).

K Fossette accessoire = fossette du dent accessoir = du dent latéral antérieur (selon Agassiz).

L Dent lunulaire ou dent cardinal antérieur.

M Fossette du dent lunulaire.

N Dent cardinal (Schlosszahn al.).

O Fossette du dent cardinal.

P Dent ligamentaire ou dent cardinal postérieur.

Q Fossette du dent ligamentaire.

Les dents peuvent être coniques, aigus, crénelés, bifides, doubles (duplicati lat.) etc.

R Nymphe. Ordinairement on use ce mot au pluriel, mais je trouve que quelque fois il est util (si non nécessaire) de l'user même

au singulier. Elle dénote la partie de la charnière généralement un peu relevée dans laquelle s'attache le ligament (ninfa it., bandnymphe al., nymph angl., nympha lat).

S Bord *antécardinal.*

U » *postcardinal.*

V Cavité umbonale (fornix umbonalis lat., selon Born.).

Fig. 5, 6, 7, 8.

COQUILLES AVEC DES LAMELLES CONCENTRIQUES, RADIALEMENT CARÉNÉES ET BICARÉNÉES, VUES DU DOS ET DU CROCHET.

AC (fig. 5), AC, AF (fig. 6) Carène.

AC (fig. 7), AC, AF (fig. 8) Carène postérieure.

AE (fig. 7), AD, AG (fig. 8) Carène antérieure.

ABC (fig. 5, 6, 7 8) Espace *postcarénal.*

ACE (fig. 7), ACD, AFG (fig. 8) » *intércarénal.*

ACQ (fig. 5), AEQ (fig. 7) » *antécarénal.*

ACF (fig. 6, 8) » *bipostcarénal.*

AGF + ACD (fig. 8) » *bintercarénal.*

AGD (fig. 8) » *bipost-inter-carénal.*

A (fig. 5, 6, 7, 8) Crochets (umbones, nates lat.). V. expl. fig. 1.

Fig. 9.

COQUILLE À VALVES FERMÉES AVEC DES STRIES CONCENTRIQUES, VUE DE CROCHET.

DCBA Longeur *zonale* antéro-postérieure de la valve gauche.

DEFA » » » » » droite.

CDA Angle *sectantérieur* de la valve droite.

EDA » » » » gauche.

EDC Angle *bisectantérieur.*

BAD » *sectupostérieur* de la valve droite.

FAD » » » » gauche.

FAB » *bisectupostérieur.*

MRST Lunule (Lunula lat., it. et al., Lunule angl.) Les anciens mots areola et anus lat. aujourd'hui sont peu usés.

MTS *Semilunule* de la valve droite.

MRS » » » gauche.

MYXV *Extralunule* (excepté l'espace MRST de la lunule). Elle se

trouve assez plus rarement que la lunule. Quelque fois elle est plus marquée que celle-ci, quelque fois moins (par ex. dans la venus subplicata D'Orb.).

MYX *Semiextralunule* de la valve droite (excepté MTS).

MVX » » » gauche (» MRS).

MYXV *Bilunule* (avec l'espace MRST c'est à dire lunule et extralunule).

GKPO Corselet vulve ou écusson, le premier mot est le plus usé (corsaletto, vulva it., feld, schildchen al., escutcheon angl., area angl., it., al., lat., vulva lat.). Je croirais de reserver le mot area seulement pour les Pectunculus, Arca, Nucula et semblables, quoique généralement il est usé par les auteurs italiens et anglais dans le même sens de corselet.

O, K Nymphes V. expl. fig. 4.

P Baillement ou fente *anténymphal* du corselet (hiatus, ou rima vulvae *antenymphalis* lat., *Vordnymphenschlilz* al., *rima anteninfale* it.).

GL Baillement ou fente *postnymphal* du corselet, *Vordnymphenschlitz* al , *hiatus postnymphalis* lat., *rima postninfale* it.).Entre les nymphes O, K, existe quelque fois un autre petit baillement étroit que j'appelle baillement ou fente nymphal (*hiatus nymphalis* lat., *Nymphenschlitz* al., *nymphal cleft* angl., *rima ninfale* it.) Il est superflu de dire que pour étudier ces baillements dans les coquilles vivantes il faut avant tout enlever le ligament. Dans le ligament on distingue la partie interne, qui reste cachée dans la charnière, qu'on appelle « cartilage », et le ligament proprement dit (ligamentum lat., ligamento it , ligament angl., Band al.). Wood propose d'appeler « connexus » le ligament pris dans son ensemble.

PZUH *Extracorselet* (*extravulva*, *extrarea* lat., estravulva it.). J'appelle ainsi cet espace qui souvent borde le corselet. Il est généralement oblong, déprimé, avec des ornements divers de ceux du dos de la coquille, il est limité par une espèce de carène. C'est pour ça que lorsque il s'aggrandit, il devient un vrai espace postcarénal.— Il se trouve surtout chez le venus (p. e. dans la venus rugosa). L'extracorselet de la valve gauche est presque toujours plus dévéloppé que celui de la droite.

Fig. 10, 11.

UN PECTUNCULUS ET UNE ARCA VUS DU CROCHET.

ABC *Area* d'un Pectunculus.

DEF » d'un'Arca. — Il est très interessant d' étudier les ornements de l'area, c'est à dire ses sillons, ses stries etc.

COQUILLES DES GASTÉROPODES

Fig. 12.

Coquille turriculée (thurmförmig al., turrita turriculata lat. et it., turreted, turriculated angl.) vue de face avec des côtes axiales régulières,des stries spirales,qui les croisent, et quelque varice axiale. Généralement les coquilles des gastéropodes sont enroulées autour d'une « columelle », mais il y en a qui ne le sont pas (fissurella etc.). La plus part des enroulées est dextre (destral angl., dextrorsa lat., rechts gewunden al., destrorsa it.); il y a aussi des espéces sénestres (sinistral angl., sinistrorsa lat., links gewunden al., sinistrorsa it). La sinistrorsité tantôt constitue un caractère specifique du genre ou de l'espéce, tantôt dépend des conditions de vie, et surtout des degrés de salure de l'eau etc. La coquille des gastéropodes peut être ovoidale (eiförmig al.), globulaire (kugelförmig al.), conique (trochiformis lat.), turbiforme (kreiselformig al), claviforme, canaliculée, fusiforme, subfusiforme, bossue (gibba lat.),mince, planorbique, auriforme (earshaped angl., auriculiformis lat., auriculiforme it , ohrförmig al.), solide (ponderosa lat.), epaisse (crassa lat., ispessita, spessa it., verdickt al.), discoide, ventrue, cilindrique etc., ombiliquée (delphinula, solarium...), perforée (fissurella, pleurotomaria...) ordinairement on confond ces deux derniers mots mais à tort. Certaines coquilles sont épidermées.

AFEDCB Ouverture (aperture angl., apertura it. et lat., Mündung al., elle était appellée anciennement bouche, mouth angl., bocca it.) qui peut être elliptique, oblongue , ovalaire, arrondie , evasée (effusa lat., ausgegossen al.), rétrécie, entière (ganz al., integra lat., intera it , entire angl. c'est à dire sans échancrure ni canal, comme se trouve généralement chez les erbivores «holostomata»), canaliculée (canaliculata lat. et it.,canalartig verlangert,mit Canal versehen al.,canaliculated, channeled into a canal produced angl., comme se trouve généralement chez les carnivores « siphonostomata »), échancrée (incisa, emarginata lat., eingeschnitten al., smarginata it., notched angl.) tronquée etc. Elle est verticale ou axiale lorsque sa diagonale est presque parallele à l'axe columellaire, oblique (schräg al.), lorsque elle est inclinée, alors on peut

en déterminer l'angle d'inclination. Lorsque l'ouverture est oblique et penchante (declivis lat.) et on ne peut pas en donner de bonnes figures en profil, il est util d'en déterminer le plan. On arrive à cela en déterminant les angles que fait la diagonale antéropostérieure et la diagonale transverse sur l'axe et sur l'orizont.

AFED Lèvre (ou bord, labre ou encore mieux « labium ») interne (droite) = labbro interno it., inner lip. angl., innenlippe al., que je distingue du coté columellaire (Spindelrand al., Wall of the aperture angl.). La première (Innenlippe al.) est toujours surmise au second, et je la considère comme une expansion peristomale. Lorsqu' elle manque (ce qu' arrive souvent) je dis que le coté columellaire est nu. C' est à dire que le bord interne de l'ouverture est formé simplement par le coté du body-whorld.— AF bord antérieur de la même lèvre, FE bord médian, ED bord postérieur. Plusieurs auteurs même anciens (Born etc.) appellent « labium » la lèvre interne et « labrum » l'externe. L'idée me semble juste, et quoique il n'existe pas aucune difference entre les mots labium et labrum, qui sont équivalents, je crois qu' il serait très util d'user ces mots toujours dans ce sens. La lèvre interne peut être calleuse, libre, adherante, ridée (hunzelig al.), tuberculeuse, pliée (il est très interessant d' étudier le nombre, la dimension et la position des plis), reflechie (reflexum lat., reflected angl.), épanchée ou épanouie à la base (basi effusum lat., sparso, effuso it., spread over the base, ou expanded angl., zerstreut al.).

HXG Spire (Gewinde al., spira it., spire angl.) c'est à dire toute la coquille moins le dernier tour. Elle peut être allongée (verlängert al., elata lat., allungata, bislunga it.), emboitée (introrsa it. e lat.), proéminente (erhoben, forspringend al., prominente it.), exerta, emersa (estrorsa lat.), enroulée (convoluta lat. et it., zusammengewickelt al., convolute angl.), cylindrique (walzenförmig al.), aiguisée (subulata lat., sharpened angl., pfriemenförmig al.) etc... Les tours (circumvolutiones girorum, anfractus lat., giri anfratti it., volutions, whorls angl., windungen, umgänge al.) peuvent être élancés, concaves, (hohl, ausgehölt al , concavi it., concave angl.), plans, convexes, granuleux (gekörnelte al.), renflés, lisses, aplatis, pliés, ridés, disjoints (soluti ou liberi lat., liberi, disgiunti it., disjoined angl. , abgefondert, getrennt al., p. ex. dans certaines Cyclostoma, Scalaria etc. Helix aspersa L. type), carenés (antérieurement, postérieurement ou au milieu). Ils peuvent s'accroître lentement (comme dans certains turbo...), la spire alors devient souvent pupoide. Ils peuvent croître rapidement (comme dans les sigaretus.....).

HXG Angle spiral dont on mesure les degrés avec l'helicomètre et dont l'importance change selon les espèces.—X extremité ou sommet de la spire (apex , vertex lat. , spitze al., apice , vertice, estremità della spira it.), qui peut être aigue, mammillaire ou mameloné (bulimus), convexe (dans les solariurn etc.), décollée (decollatus mutilatus lat. p. ex. dans certains bulimus). Il est très interessant étudier les premiers tours, surtout les rudimentaires , qui forment un nucléus (Nucleus lat , nucleo it. , Embryonalschale al.) caracteristique, qui est senèstre dans les piramidellidae.

EDC Angle postérieur de l' ouverture, qui peut être calleux, canaliculé, sinueux etc. Lorsque il se détache de la coquille (ce qu'arrive souvent dans les espèces à sutures fortement canaliculées), on dit qu'il est libre « angulus solutus » lat. (p. ex. dans l'eburna spirata, dans certaines melania etc.). V. expl. sutures.

DCBA Lèvre externe (gauche) = labro esterno it., aussenlippe al., labrum externum lat., outer lip angl. — DC bord postérieur de la même lèvre, CB bord médiane, BA bord antérieur, CBA angle (lorsque il existe) antérieur de la même lèvre. Dans la lèvre externe il faut en outre étudier le bord extérieur, qui peut être bordé (marginatus lat.) , ailé (alatum flügelartig al., wingshaped angl., alato it) , variqueux, ..., le bord intérieur (qui peut être ridé, denticulé, plié, lisse, ...) et l'arête (qui peut être émoussée, tranchante ...). Il est très interessant d' étudier la lèvre externe des coquilles surtout dans les conidae (pour le sinus postérieur) et dans les alatidae (pour son grand développement et son expansion, et quelque fois pour sa digitation p. ex. dans les gen. alaria, pteroceras etc.). Elle peut être reflechie = labrum reflexum lat., reflected angl., zurückgeschlagen al. (p. ex. dans les Bulimus), inflechie = labrum inflexum ou involutum lat., inflected angl , eingerollt, eingebogen al. (p. e. dans les cypraea) etc. Presque tous le auteurs français usent le mot bord (Rand al.) au lieu de lèvre; mais cela les empeche de se servir outrement du mot bord. C'est pour ça que pour désigner les bords de l'ouverture dans leur ensemble (surtout le bord externe), je prefère me servir du mot « lèvre » ou même de « labre » (Dautzenberg Moll. Rouss.), qui repondent aussi au « lip » des anglais, « lippe » des allemands, « labro » des italiens, « labrum » lat. D'ailleurs le mot bord est usé dans un sens divers p. ex. dans la nomenclature des bivalves. Je crois qu'il est util de retenir le mot bord seulement pour dénoter le coté columellaire; c'est à dire lorsque manque la lèvre interne.

BAF Angle antérieur de l'ouverture, qui peut être échancré, canaliculé etc.

AOPHGR *Corpanfractus* lat. (Bodywhorl angl., *Corptour* franç., *Corpanfratto* it., *Körperumfang*, *Korperwindung* al.) J'appele ainsi le dernier tour (letzer Umgang al.) pris dans son ensemble. Les anciens l'appellaient corpus ou venter lat. mais ces mots sont aujourd'hui usé dans un sens different. En lui donnant un nom j'ai cru préferer de traduir le mot anglais. C'est pour cette raison que je n'ai plus usé les mot busto it. (trunchus lat., tronc franç., rumpf al.), que j'avais proposé dans mon ouvrage sur la faune de S.J. Ilarion. M. Hörnes et M. Speyer l'appellent Schusswindung al. On peut bien user ce mot, mais ce que je propose me semble preferable pour l'unité de la terminologie. Dans certaines espèces il est plus developpée dans les femelles que dans les mâles. Il presente les caractères plus interessants et sur lesquels s'appuis souvent la détermination de l'espèce. Quelque fois il constitue par lui même toute la coquille. C'est pour ça qu'il est très util de lui donner un nom particulier. D'ailleurs il est souvent avantageux de donner la relation numerique de la *longueur axiale* de la spire et celle de dernier tour. Mais la longeur axiale de celui-ci ne signifie pas celle du tour entier (c'est à dire du corp-tour) mais celle de sa partie antérieure qui est donnée par celle de l'ouverture. Je distingue ainsi la longeur axial du dernier tour, la longeur axial du corptour, et la longeur spirale du même (c'est à dire la longeur superficielle spirale de sa peripherie).

EOPR Base = Basis, Grundfläche al., base it. et angl., du dernier tour. Elle presente souvent des caractères très interessants qui peuvent donner d'utils renseignements. Elle est souvent pourvue d'ornements divers que le reste de la coquille : de sillons, de bourrelets, etc. Dans le g. Scalaria elle a un aplatissement particulier, qui est appelé disque par Deshayes.

FO *Cou* (*Collum* lat., *Neck* angl., *Hals* al., *Collo* it.) = la partie antérieure et plus rétrécie de la base; qui n'existe pas dans tous les coquilles; dans la fig. 14 c'est en B.

GH, KL, MN, etc. Sutures (nähte al., suturae lat., suture it., sutures angl.), qui peuvent être simples, linéaires (linienförmige al., lineares lat. etc.), marginées, canaliculées (rinnenförmige al., canaliculated ou channeled angl., canaliculate it.), marquées (notatae lat.), imprimées (impressae lat., impresse it.), couvertes de callosité (Ancillaria), profondes (tief al., deef angl.), crispées etc.

Fig. 13.

Coquille pupoide vue du dos, avec des stries obliques, et avec pe-

ristbome à l'ouverture. Le péristome (Mundsaum al., peristoma it. et lat.) peut être simple, réfléchi, continu (continuus lat., continous angl , zusammenhängend al., continuo it.), interrompu (interrotto it , disjunctum lat , unterschèiden al., interrupted angl.) etc.

Fig. 14.

Coquille fusiforme (spindelförmig al.), antérieurement canaliculée avec des tours carénés. La carène peut être saillante (hervorranged al.', épineuse, proéminente, tuberculeuse, liriforme, crénelée etc. A sinus (ce titre me semble plus approprié que celui de rima, ou d' échancrure) de la lèvre externe caracteristique chez les pleurotoma. Lorsque celle-ci est cassée, on l'étudie dans les signes d'accroissement (marks of growth angl., *segni* di accrescimento it., *zuwachszeichen* al. — Les expression « stries d'accroissement, strie di accrescimento it., lines of growth angl. qui sont généralement usées, me semblent moins appropriées, confondant la sculpture avec la structure), qui se voient dans la même fig. 14. Le canal BC (= canale it., canalis lat.) est appellé par les anciens auteurs queue (cauda lat., schwanz al.) ou rostrum lat. (Schnabel al.). Il peut être grêle, solide, allongé, ouvert (patulus lat.) , raccourci , échancré (emarginatus lat., smarginato it.), courbé en arrière (retroversus lat., zuruckgedreht al., retroverso it., reversed angl.) etc.

Fig. 15.

Opercule (Deckel al., operculo it., operculum lat. et angl), spiral d'un turbo vue de la face interne. L'opercule a une importance différente non seulement selon les genres , mais quelque fois selon les espèces. Il peut même manquer dans la même espèce. Il peut être spiral (multispiré, subspiré, paucispiré, articulé, turriculé), non spiral (concentrique, imbriqué , onguiculé , articulé , radié (P. Fisher)). Cela se montre dans la face interne , dans laquelle on étudie aussi l' impression musculaire et le nucléus. La face externe de l'opercule peut être convexe , sillonée, granuleuse, etc.... — Beaucoup de gastéropodes terrestres dans l'hiver renferment leur ouverture avec un épiphragme (Draparnaud), qui est un espèce d' opercule non adherant ni solide, mais terreux, membraneux et caduc.

Fig. 16.

Coquille turbiforme ombiliquée; BCD « bourrelet » (cercine it., Wulst al.) ombilical; A ombilic (umbilicus lat., nabel al., navel angl., ombelico it.) qui peut être profond creux, superficiel, rempli de callosité (certains natica etc.). Lorsque il est étroit, oblongue et en partie rempli de callosité (callus lat., callo it., Nabelschwiele al.) est appellé fente ombilicale (rima ombilici lat., Nabelritze al., rima, ou fenditura it.). S'il n'existe pas, mais il est simulé par un doublement de la lèvre interne on le dit « faux ombilic » (umbilicus spurius lat., false navel angl., falscher nabel al., falso ombilico it.), cela arrive p. ex. dans certaines Natica. — GFE angle *extraoral*, (*extraoralis* lat., *estrorale* it.).

Fig. 17.

Coquille trochiforme, BFE, BDE etc. angle périférique, AB columelle tordue et tronquée, CDF périphérie = periferie it., periphérie al., periphery angl. La périphérie d'une coquille pupoide ne coincide pas avec celle du dernier tour mais avec celle du tour plus gros.

Fig. 18.

Coquille coniforme à tours scalariformes ou étagés=(anfractus, scalariformes lat., scalariformi, gradati it., treppeförmig al., gradated stairshaped angl.) avec des sutures profondément canaliculés.

Fig. 19.

Coquille rapidément croissant (p. ex. Sigaretus).

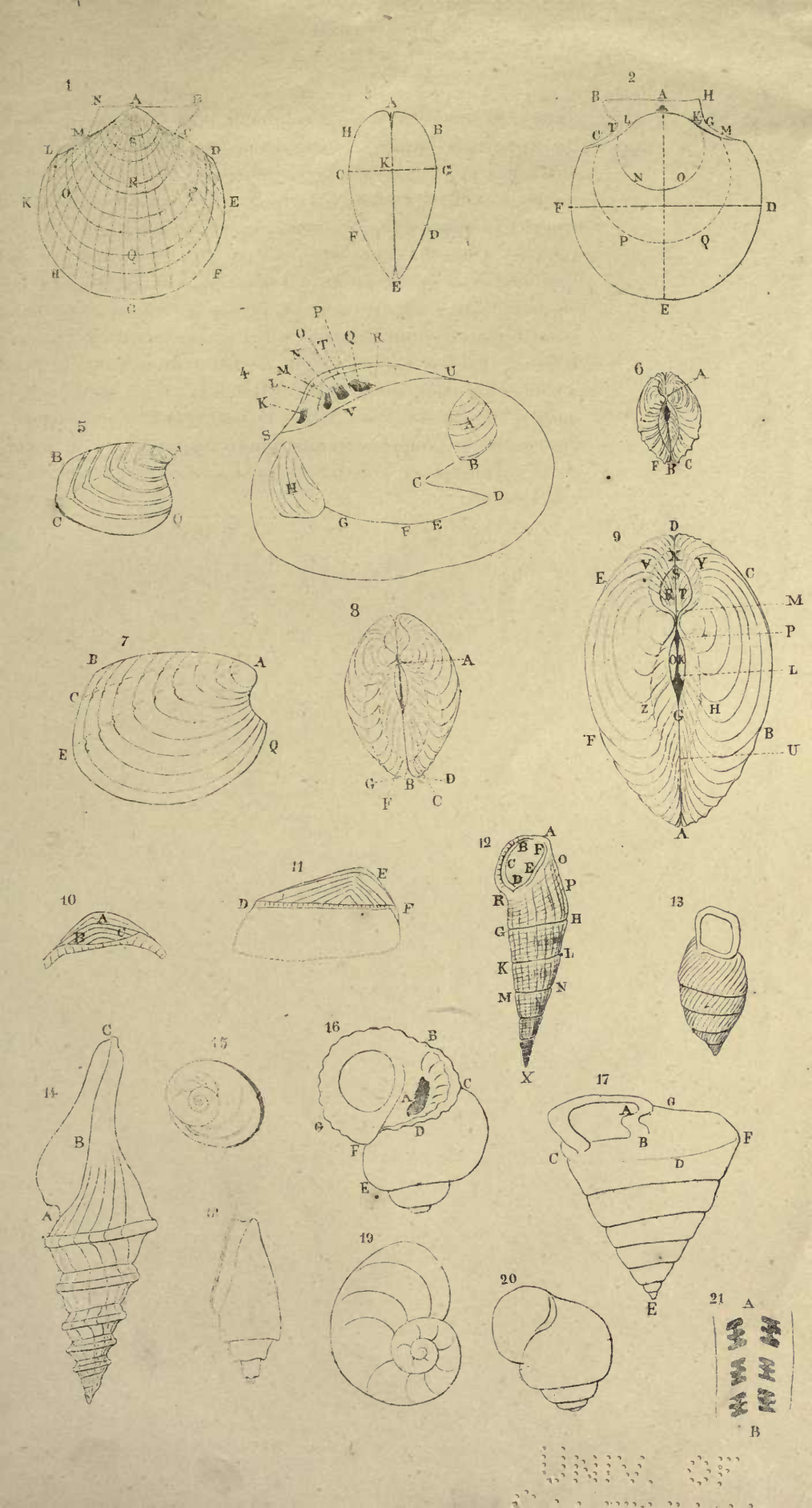
Fig. 20.

Coquille lentement croissant. V. expl. fig. 12.

Fig. 21.

Section d'une coquille laissant voir les tours et la columelle (pillar angl., columella it. et angl. Spindel al.). Les tours peuvent être à la section ronds, quadrangulaires, imbricés (comme dans la

figure 18), emboités etc. La columelle peut être épaise, subtile, droite, tordue, arquée, creusée, trouée, étalée etc. Son extremité antérieure est visible dans l'ouverture. Il est très interessant d'étudier la section, surtout chez les Nerinea, dans lesquels les plis entérieurs fournissent de bons caractères specifiques. L' intérieur des coquilles nous offre souvent des caractéres très interessants: des plis, des stries, des dents, des sillons etc. c'est pour ça qu'il est très util d'étudier les moules internes,dans lesquelles ces caracteres se montrent en relief p. ex. les varices (Varigera D'Orb.). Quelque fois on y peut étudier l'impression du muscle adducteur qui peut être ovalaire (Haliotis), en fer à cheval (p.ex. dans le g. patella, dans lequel la partie antérieure repond à l'ouverture de l'impression musculaire (sinus lat.) et le sommet de la coquille regard aussi à la partie antérieure au lieu qu'à la postérieure).



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NOTICE

SUR

LE GENRE SANDBERGERIA,

GENRE NOUVEAU DE MOLLUSQUES GASTÉROPODES

DE LA FAMILLE

DES

CÉRITHIOPSIDAE.

PAR

J. BOSQUET,

Membre de l'Académie royale des sciences à Amsterdam, etc.

(Extrait du troisième volume des Mémoires pour servir à la description géologique de la Néerlande.)

HAARLEM, A. C. KRUSEMAN.

1861.

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En 1836 Mons. H. Nyst avait reconnu comme espèce nouvelle une petite coquille qui se rencontre assez fréquemment dans le terrain tertiaire de quelques localités du Limbourg belge et il a fait connaître cette espèce sous le nom de Pyramidella cancellata.

Cette coquille, qui est rarement d'une conservation parfaite, avait attiré depuis longtemps mon attention parceque j'avais reconnu qu'elle ne présente point les principaux caractères du Genre dans lequel elle a été placée par le savant Auteur belge et que par conséquent elle ne peut point rester dans le Genre Pyramidella.

En étudiant de nouveau cette espèce dans ces derniers temps, je reconnus qu'elle constitue le type d'une nouvelle coupe générique qui se rapproche beaucoup du Genre Cerithiopsis de Forbes et Hanley. Et, après avoir constaté que le petit opercule que j'ai figuré en 1859 [1]) comme appartenant à la Nematura pupa Nyst sp. ne pouvait point être rapporté à cette dernière, j'ai commencé à penser qu'il appartenait à peu près indubitablement à l'espèce dont il s'agit ici, puisque celle-ci se trouve pareillement dans la localité de Vliek (Limbourg neer-

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[1]) Recherches paléontologiques sur le terrain tertiaire du Limbourg neerlandais, page 7, pl. I, figs. 7 a, b. Dans les: *Natuurkundige Verhandelingen der Koninklijke Akademie van Wetenschappen te Amsterdam*, Deel VII.

landais) dans laquelle il a été recueilli et que, par ses éléments constitutifs il se rapproche également de celui du Genre Cerithiopsis.

Depuis lors je conçus le projet de décrire ce nouveau Genre en l'illustrant de figures suffisamment agrandies. Je communiquai mon intention à Mr. le Dr. Fridolin Sandberger à Carlsruhe, en joignant à ma lettre plusieurs échantillons de la coquille ainsi que de nouvelles figures, plus fortement agrandies, de l'opercule dont je venais de trouver un échantillon d'une meillieure conservation et plus complet qui ceux qui m'étaient connus jusqu' alors. J'appris alors que le savant Paléozoologiste allemand, qui veut bien m'honorer de son amitié, avait trouvé la même espèce dans le bassin de Mayence, et qu'après une étude approfondie il était arrivé aux mêmes conclusions et qu'en outre il partageait mon opinion pour ce qui concerne l'opercule.

Le nouveau Genre que je propose pourra être caractérisé de la manière suivante:

Char. *Testa imperforata, solidiuscula, nitidula, turriculato-conica, antice rotundata, postice acutiuscula. Anfractus numerosi, depressi, ultimo convexo, praecedente duplo altiore, superficie costato-cancellata. Apertura obliqua, oblique trapezoïdali, antice atque postice canaliculata. Labro externo simplici, arcuato, anterius producto, interno calloso, columellam brevem late obtegente; callo sub-cuniplicato, margine externo acuto, prominulo, spiraliter tortuoso.*

Operculum calcareum, trapezoidale, nucleo laterali, striis incrementi concentricis, et tuberculis tribus, uno sub-centrali, ornatum. Facie interna area triangulari notata.

Coquille non ombiliquée, assez épaisse, luisante, turriculée-conique, arrondie en avant obtusement pointue en arrière. Formée de tours nombreux; les embryonaux régulièrement enroulés, convexes, lisses; les intermédiaires déprimés et le dernier à peu près deux fois aussi haut que le précédant; la surface de tous ces derniers cancellée. Ouverture oblique, obliquement trapézoidale, offrant deux gouttières: l'une en avant et l'autre à l'angle postérieur qui est aigu. De là résulte que cette ouverture présente une certaine ressemblance avec celle des Cerithium. La lèvre externe est simple, arquée-sinueuse et fortement projetée en avant à sa partie antérieure; la lèvre interne est calleuse et recouvre la columelle sur une étendue considérable. La callosité offre un pli oblique, plus ou moins apparent dans les divers individus; son bord externe est aigu, légèrement saillant, tortueux et se raccorde au bord antérieur en avant de la gouttière antérieure.

L'opercule est calcaire, trapézoidal, à noyau marginal; il n'est formé que d'un très-petit nombre de lames d'accroissement concentriques, et il offre à l'extérieur trois tubercules: un

sub-central de forme cylindroide et deux submarginaux aplatis. Sa face interne présente une aire triangulaire rentrante en pente rapide vers le centre.

Ce Genre présente avec le Genre Cerithiopsis Forb. et Hanl. [1]) une affinité tellement grande que je n'hésite nullement d'adopter l'idée de Mr. le Dr. Frid. Sandberger (*in litter.*) qu'il devra être rangé dans la même famille. La famille des Cerithiopsidae a été proposée en 1853 par MMrs. H. et A. Adams dans leurs: Genera of recent Mollusca, part VIII, pag. 239 et suivantes. Cette famille ne comprenait jusqu'ici que le Genre unique qui a servi à la création du nom, avec le sous-Genre Alaba, proposé par les deux excellents Naturalistes américains qui ont créé la famille.

Suivant MMrs. Adams la Famille des Cerithiopsidae doit être placée, dans la Méthode naturelle, dans le voisinage de celle des Pyramidellidae, parceque les animaux de ces deux familles présentent dans leur organisation plusieurs caractères qui leur sont communs.

Le type du Genre Cerithiopsis est la Cerithiopsis tubercularis Montagu sp. des côtes de l'Angleterre. D'après Edw. Forbes [2]) cette espèce vit à la profondeur de 4—40 brasses.

La nouvelle coupe générique qui fait le sujet de la présente Notice se rapproche du Genre Cerithiopsis par ses tours embryonaux enroulés de la même manière, par ses ornements extérieurs à peu près semblables, par les caractères de la bouche, ainsi que par son opercule à noyau marginal et à éléments constitutifs concentriques. Elle diffère cependant suffisamment du Genre Cerithiopsis pour devoir être considérée comme Genre bien distinct. Les plus importantes différences sont: 1° la lèvre interne recouvrant la columelle sur une très-grande étendue et se raccordant au bord externe en avant de la gouttière antérieure, 2° en ce que la partie antérieure du dernier tour est convexe et couverte de plusieurs côtes transversales et 3° surtout en ce que l'opercule est calcaire, de forme trapézoidale et qu'il n'est composé que d'un nombre de lames d'accroissement bien moins considérable que celui du Genre Cerithiopsis. A ces divers caractères différentiels de l'opercule pourra encore être ajouté la présence de trois protubérances au côté externe et d'une facette triangulaire au côté interne dans celui du nouveau Genre.

Je me fais un plaisir de dédier ce Genre intéressant au savant Professeur allemand à qui la science est redevable de tant de travaux paléontologiques importants.

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[1]) 1849. *History of British Mollusca and their Shells.* Vol. III, pages 364—368.

[2]) 1850. *Report on the Investigation of British marine Zoology by means of the Dredge*, pag. 202.

Il ne sera sans doute pas superflu d'ajouter encore ici quelques détails sur les caractères de l'espèce typique, qui est jusqu'ici la seule de cette coupe qui nous soit connue. Elle sera désignée sous le nom de:

Sandbergeria cancellata Nyst sp.

Synon. Pyramidella cancellata H. Nyst, 1836. Recherches sur les coquilles fossiles de
" Hoesselt et de Klein-Spauwen p. 26, N°. 68, pl. 3, fig. 68 (*mala*).
" sulcata Potiez et Michaud, 1838. Galérie des Mollusques du Muséum de Douai. Tom. I, pag. 357, N°. 5.
" cancellata Nyst, 1843. Description des coquilles et des Polypiers fossiles des terrains tertiaires de la Belgique, page 430, Pl. XXXVIII, figs 14 a, b, c.
Turbonilla cancellata Alc. D'Orbigny, (1847) 1852. Prodrome de Paléontologie stratigraphique universelle. Vol. III, page 5, N°, 71.'

Caract. spécif. Coquille turriculée conique, très-petite. L'échantillon figuré a 9 millim. de longueur, et son plus grand diamètre transversal est de 3—3¼ de millimètre. Ce sont à ce qu'il semble, les plus fortes dimensions de l'espèce. La spire égale à peu près le double de la hauteur du dernier tour. Elle se compose d'une partie embryonale lisse, trochoide, obtusement pointue et formée de 2—2½ tours; ceux-ci sont convexes, régulièrement enroulés et croissent assez rapidement en grosseur; elle a 7—8 tours moyens qui, à l'exception des 2—3 premiers plus ou moins convexes, sont presque plans; ils sont séparés entre eux et du dernier par une suture assez profonde. Les 3—4 premiers tours moyens sont ornés de 12—18 côtes longitudinales arquées; le nombre de ces côtes augmente considérablement sur les tours suivants, de sorte que l'on en compte 50—54 sur l'avant-dernier et jusqu' à 60—67 à la surface du dernier. Toutes ces côtes longitudinales sont coupées, en général à angle droit, par des cercles transversaux aplatis, non interrompus, d'où résulte qu'aux points d'intersection il se produit des tubercules assez gros. Le bord postérieur des tours, correspondant à la gouttière postérieure de l'ouverture est constamment protubérant sous forme de bourrelet marginal. Les cercles, d'abord au nombre de 2—3 sur les deux à trois premiers tours moyens, n'augmentent que jusqu' au nombre de cinq sur les deux derniers tours moyens; à la surface du dernier tour leur nombre s'élève jusqu' à 12—13, dont 7—8 sur la portion antérieure convexe.

Pour ce qui concerne la forme et les caractères de la bouche il n'y a plus rien à ajouter.

Il en est de même de ceux de l'opercule. Les dimensions du plus grand échantillon qui nous est connu de ce dernier sont: Longueur un peu plus de ¾ de Millim., et largeur à peu près égale.

Couleurs. Dans quelques échantillons on retrouve encore des restes de la la couleur primitive. Ils consistent en général en une bande d'un violet-rose en avant des sutures et en une région de même couleur sur la partie en pente du dernier tour. D'après quelques autres échantillons il semble qu'il y a eu également des individus chez lesquels tous les cercles transversaux étaient colorés, tandis que les espaces intermédiaires étaient blancs.

L'opercule offre pareillement sur un fond blanc, d'abord du côté du nucleus une grande tache triangulaire d'un rose-violet correspondante à la facette ou aire du côté interne, et ensuite, le long des trois autres bords, une large bande de même couleur.

Gisem. et Local. D'après nos connaissances actuelles la Sandbergeria cancellata est propre aux assises moyenne et inférieure des couches Oligocènes de Mr. Beyrich. Jusqu'ici elle n'a été rencontrée que dans le Limbourg belge à Bergh, à Klein-Spauwen, au Vieux-Jonc, à Heerderen, à Hénis et à Looz dans les étages inférieur du système rupélien et supérieur du syst. tongrien de Dumont, ainsi qui dans l'étage inférieur de ce dernier système à Lethen [1]); et dans le Limbourg neerlandais elle a été recueillie à Vliek, à Humkoven, à Klimmen, au Goudsberg, et dans le Krékelenbosch. Selon Mr. le Prof. Frid. Sandberger elle se rencontre rarement dans le Meeressand du bassin de Mayence à Weinheim près d'Alzey et suivant Mr. Weinkauf également à Waldböckelheim.

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[1]) A Hoesselt et à Neer-Epen elle n'existe que dans l'assise inférieure du Diluvium avec cailloux siliceux.

EXPLICATION DE LA PLANCHE.

Figure 1, a. Coquille fortement grossie, vue en dessus.

" " b. La même, grossie de même, et vue en dessous.

" " c. Trait, indiquant la longueur naturelle de l'échantillon.

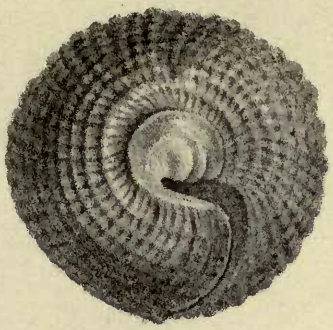
" " d. Autre échantillon, fortement agrandi, vu par l'extrémité antérieure.

Figure 2, a. Opercule, fortement grossi, vu du côté externe.

" " b. Le même, grossi de même, et vu du côté interne.

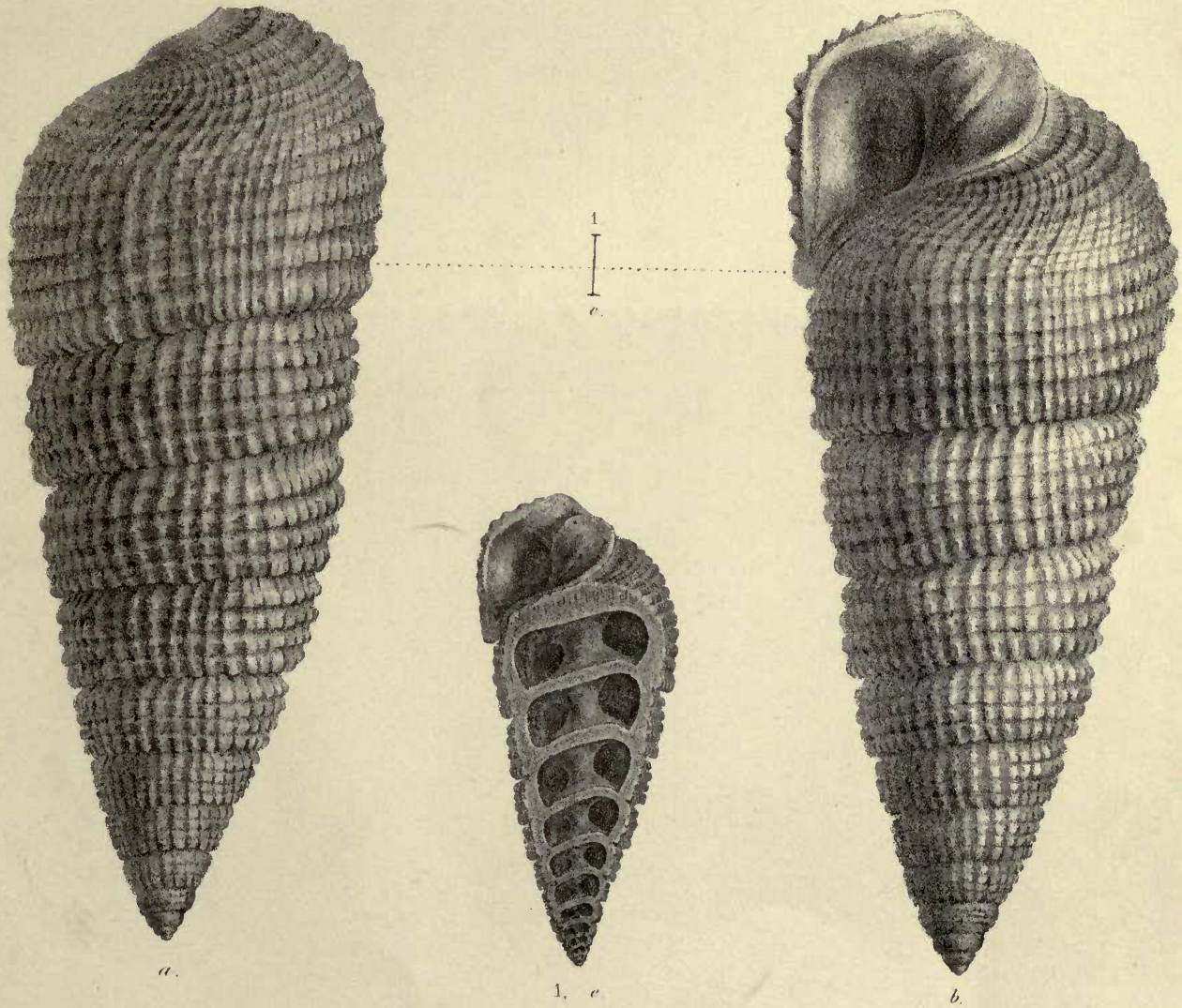
Sandbergeria cancellata Nyst sp.

2, *b*.



1, *d*.

2, *a*.



a.

1, *e*

b.

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OVER DE GEOLOGIE VAN NEDERLAND zijn bij den Boekdrukker A. C. KRUSEMAN *te Haarlem*, uitgegeven en te verkrijgen:

GEOLOGISCHE KAART VAN NEDERLAND, vervaardigd door Dr. W. C. H. STARING, uitgevoerd door het Topographisch Bureau van Oorlog. Schaal van 1 : 200 000. 28 bladen — verschenen blad 14 Rijnland, blad 19 Betuwe, blad 20 Munsterland. Ieder blad. . . . . *f* 1,—.

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DE GEOLOGIE VAN NEDERLAND, Handleiding voor de bezigtigers der Verzameling op het Paviljoen te Haarlem. . . . . " 0,50.

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VOORMAALS EN THANS. Opstellen over Neêrlands grondgesteldheid, van W. C. H. STARING, *met vier kaarten*. . . . . " 3,—.

GEDRUKT BIJ A. C. KRUSEMAN.

MEMORIE
DELLA
SOCIETÀ ITALIANA DI SCIENZE NATURALI
Tomo II, N. 1.

10

DEI MOLLUSCHI

RACCOLTI NELLA PROVINCIA DI PISA

PER

ARTURO ISSEL

MILANO
COI TIPI DI GIUSEPPE BERNARDONI
1866

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DEI MOLLUSCHI

RACCOLTI NELLA PROVINCIA DI PISA

Or sono alcuni anni mi trovavo a Pisa in qualità di studente, e parendomi assai lunghe le ore d'ozio lasciatemi dai corsi universitari, pensai di impiegarle facendo raccolta di conchiglie.

L'esito felice delle mie prime ricerche mi stimolò ad intraprenderne altre, ed in tal guisa la caccia dei molluschi divenne il mio passatempo prediletto; finchè terminati gli studi e conseguita la laurea, io partiva da Pisa più ricco di chiocciole che di dottrina.

Tornato a casa, ho ordinato e determinato con diligenza le mia raccolta; fattone poi il catalogo e corredatolo di note sinonimiche, ho creduto bene pubblicarlo colla speranza che contribuisca almeno ad agevolare ulteriori studi intorno alla malacologia toscana.

Oltre all'aver esplorati i dintorni di Pisa ho visitato anche il Lucchese, la Val di Nievole e parte della Maremma Toscana, e nella presente Memoria sono noverate anche le specie da me raccolte nelle accennate località.

Mi è sembrato parimente utile il far menzione di quelle trovate sulle Alpi Apuane, nel Livornese e nel Lucchese da vari amici studiosi di conchiologia, cui debbo parecchie interessanti comunicazioni.

Forse in virtù del suo clima singolarmente mite ed uniforme, ed a causa della sua configurazione, la provincia di Pisa è popolata da un gran numero di molluschi terrestri e fluviatili. Fra questi, eccettuate due o tre specie poco spiccate ed alcune varietà, non si osservano forme peculiari; vi abbondano invece le specie dell'Italia superiore e della Francia ed incominciano ad apparirvi scarsi rappresentanti di una fauna più meridionale (*Pupa Philippii,* Cantr.; *Melanopsis Dufourii,* Fer., ecc.).

Ciò che asserisco per la fauna malacologica di Pisa può estendersi ragionevolmente a quella di tutte le provincie toscane.

Bagnato ad occidente dalle acque del Mediterraneo, il territorio di Pisa dà ricetto sulle sue spiaggie ai molluschi terrestri che non si discostano dal mare (*Helix Pisana* Müll.; *H. trochoides,* Poir.; *H lineata,* Oliv; ecc.). La catena del Monte Pisano

che lo cinge ad oriente e le colline che occupano la sua porzione meridionale sono sede di varie specie che prediliggono le regioni montuose (*Helix cespitum*, Drap.; *H. Olivieri*, Fer.; *Pupa frumentum*, Drap. ecc.). La vasta pianura che separa i monti dal mare offre all'incontro, nelle sue folte selve, nei prati erbosi, ottimo asilo ai molluschi amanti della frescura e dell' umidità (*Cœcilianella acicula*, Müll.; *Succinea elegans*, Risso; *Zonites crystallinus*, Müll.; *Z. diaphanus*, Stud.). Finalmente, l'Arno e i canali grandi e piccoli che innaffiano l' agro pisano contengono a dovizia conchiglie fluviatili e palustri (*Paludina contecta*, Millet.; *Bythinia tentaculata*, Lin.; *Valvata piscinalis*, Müll.; *Limnæa stagnalis*, Lin.; *Planorbis corneus*, Lin.; *Pisidium amnicum*, Müll.; *Unio pictorum*, Lin. ecc.).

Mi lusingo di aver enumerate nel mio catalogo la massima parte delle specie che abitano la provincia di Pisa, non già di averle noverate tutte. Le mie ricerche, che abbracciavano un perimetro piuttosto esteso, non furono se non in pochi punti condotte con sufficiente cura e diligenza; e poi non ho fatto cenno di vari molluschi non ancora determinati.

Per chi si occupa di filosofiche speculazioni sulla origine degli esseri, non meno che per quegli che al pari di me si limita modestamente a compilar la statistica di poche diecine di chiocciole, l'inesauribile questione delle specie è inevitabile cagione di incertezze e di dubbi.

Ho fatto il possibile per separare convenientemente in questa memoriuccia le specie e le varietà, attribuendo ai singoli caratteri un valore determinato e costante, ed ho tentato di tenere fra i vari sistemi una via di mezzo onde conciliare l'utilità di separare le forme diverse con la necessità di non moltiplicare all' infinito le denominazioni.

Non presumo però d'aver raggiunto lo scopo; anzi sono persuaso che talune difficoltà della classazione sieno insuperabili, nello stato attuale della scienza.

CATALOGO

DEI MOLLUSCHI RACCOLTI NELLA PROVINCIA DI PISA

MOLLUSCHI GASTEROPODI

Genere I. — **Limax**, Linneo.

1. Limax cinereus, Lister.

Limax cinereus, Lister (1674), Phil. Trans., IX, p. 9,
Limax maximus, Linneo (1758), Syst. nat., ed. X, I., p. 108.

Abita la provincia di Pisa e quella di Lucca; l'ho raccolto frequentemente nei giardini e nei campi, quasi sempre sotto le pietre.

Le varietà di questa specie che ebbi occasione di osservare sono le seguenti:

1. Var. *vulgaris*, Moquin-Tandon; comune.
2. Var. *cellarius*, Moquin-Tandon (*L. cellarius*, D'Argenville); comune.
3. Var. *obscurus*, Moquin-Tandon; non frequente.

2. Limax variegatus, Draparnaud.

Limax variegatus, Draparnaud (1801)., Tabl. Moll., p. 103.

Si trova nel territorio di Pisa ed in quello di Lucca; è più raro del precedente.

1. Var. *flavescens*, Moquin-Tandon; s'incontra frequentemente nell'agro pisano.
2. Var. *flavus*, Moquin-Tandon; (*L. flavus*, Linneo); non comune (Marcucci!).

3. Limax Doriæ, Bourguignat.

Limax Doriæ, Bourguignat (1861), Spicil. malac., p. 23.

Questa bella specie che fu, non è molto, scoperta in Liguria e nel Monferrato vive anche in Toscana; ne posseggo alcuni esemplari raccolti a Pisa dal sig. E. Marcucci, il quale mi ha procurati molti altri molluschi non meno interessanti.

Il *Limax Doriae* non presenta d'ordinario le dimensioni colossali dell'individuo rappresentato e descritto dal sig. Bourguignat. Fra molte diecine di tali *Limax* che ho osservati in Liguria non ve n'era alcuno la cui lunghezza superasse i 20 centimetri, l'animale essendo completamente sviluppato.

Fa d'uopo anche avvertire che esso *Limax*, quando è vivente, ha la corazza munita di sottili strie irregolari, concentriche; le quali scompariscono e sono sostituite da minute granulazioni nell'animale conservato nell'alcool.

4. Limax marginatus, Müller.

Limax marginatus, Müller (1774), Verm. hist., II, p. 10.

Ne ho trovati due soli esemplari a Pisa, sulle mura della città, nel tratto che sta fra la Porta Nuova e l'Arno.

Genere II. — **Succinea**, Draparnaud.

1. Succinea elegans, Risso.

Helix angusta, Studer (1798), Faun. Helv., in Coxe's Travels in Switzerland, III, p. 432 (senza caratteri).
Succinea amphibia, var., Draparnaud (1805), Hist. Moll., p. 58.
Succinea elegans, Risso (1826), Hist. nat. Eur. mérid., IV, p. 59.
Succinea Pfeifferi, Rossmässler (1835), Iconogr. land und sussw. Moll., I, p. 92, f. 46.

Abita Pisa ed è comune sulle mura della città, fuori di Porta a Lucca, presso la ghiacciaia, nonchè lungo i fossi dello stradone di S. Giuliano e nei prati delle Cascine. È pure abbondante nella palude di Bientina e si trova d'ordinario sullo stelo dei ciperi e d'altre piante palustri a poca altezza sul pelo dell'acqua.

Gli esemplari di Pisa presentano una conchiglia snella, allungata, di color ocraceo o giallo pallido; le dimensioni dei più voluminosi sono:

lunghezza	millimetri	14
larghezza	»	6
lunghezza della apertura . . .	»	9

2. Succinea arenaria, Bouchard.

Succinea arenaria, Bouchard (1838), Moll. Pas-de-Calais, p. 54.

Si trova a Pisa insieme alla specie suaccennata; è però meno abbondante.
Per la forma e le dimensioni mi sembra perfettamente simile agli individui figurati e descritti nell'opera di Moquin-Tandon (1).

Genere III. — **Zonites**, de Monfort.

1. Zonites fulvus, Müller.

Helix fulva, Müller (1774), Verm. hist., II, p. 56.
Zonites fulvus, Moquin-Tandon (1855), Moll. de France, II, p. 67.

Ne ho raccolti alcuni esemplari nella macchia di S. Rossore, presso la spiaggia del Gombo, nel terriccio che si trova fra le radici di vecchie quercie.

2. Zonites nitidus, Müller.

Helix nitida, Müller (1774), Verm. hist., II, p. 32.
Zonites nitidus, Moquin-Tandon (1855), Moll. de France, II, p. 72, t. VII, f. 11-15.

È frequentissimo sulle mura della città di Pisa, sul lato esterno, e segnatamente presso la ghiacciaia di Porta a Lucca. L'ho trovato anche a Firenze.

3. Zonites Leopoldianus, de Charpentier.

Helix Leopoldiana, de Charpentier (in varie collez.)
Zonites olivetorum, var. *Leopoldina*, Moquin-Tandon (1855), Moll. de France. II, p. 74
Zonites Leopoldianus, Mortillet (1862), Et. sur les Zon., in Atti della Soc. it. di Sc. nat., IV, p. 220.

L'ho trovato, ma in scarso numero, a Ripafratta, fra Pisa e Lucca, nascosto sotto le foglie secche e nella terra umida. Fu rinvenuto anche a Firenze, a Siena ed in molte altre località.
Questa specie rappresenta senza dubbio in Italia il *Zonites olivetorum* di Francia da cui si distingue per differenze di poco valore.

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(1) A. Moquin-Tandon, *Histoire naturelle des Mollusques terrestres et fluviatiles de France.* Vol. II, p. 62, t. VII, f. 33-36.

4. Zonites cellarius, Müller.

Helix cellaria, Müller (1774), Verm. hist., II, p. 38.
Zonites cellarius, Gray (1840), in Turton, Shells Brit., p. 170.

Abita Pisa ed è piuttosto raro; l'ho raccolto qualche volta in un giardino situato a poca distanza dalla Porta Nuova.

Gli esemplari di Pisa non sono affatto identici al tipo, ma si avvicinano un poco al *Zonites lucidus*, Drap.

5. Zonites obscuratus, Porro.

Helix obscurata, Porro (1841), in A. e G. B. Villa, Disp. syst. Conch. p. 56.

Si trova sulle colline lucchesi presso Ripafratta. Il mio amico Vittorio Uzielli me ne ha comunicati alcuni individui ben caratteristici da lui raccolti ai bagni di Lucca. In entrambe queste località è poco comune.

Esso *Zonites* è una forma estrema del *Z. lucidus*, Drap., il quale poi alla sua volta non è che il *Z. cellarius*, Müll., lievemente modificato. Cionondimeno, queste varie forme si mantengono in Toscana sufficientemente distinte, epperò credo utile noverarle come buone specie.

6. Zonites crystallinus, Müller.

Helix crystallina, Müller (1774), Verm. hist., II, p. 23.
Zonites crystallinus, Leach (1831), Brit. Moll., p. 105, ex Turton.

Trovasi frequentemente a Pisa e nei dintorni; abbonda nelle alluvioni dell'Arno e del Serchio.

7. Zonites hydatinus, Rossmässler.

Helix hydatina, Rossmässler (1838), Iconogr., VII, VIII, p. 36, f. 529.

Ho trovato questa specie fra i detriti dell'Arno. Ne conservo nella mia raccolta alcuni individui di Firenze inviatimi dall'egregio naturalista C. D'Ancona.

Differisce dal precedente per la sua maggior dimensione, per aver la spira più elevata e l'ombellico più aperto.

8. Zonites diaphanus, Studer.

Helix diaphana, Studer (1829), Kurz. Verzeichn., p. 86.
Zonites diaphanus, Moquin-Tandon (1855), Moll. de France, II, p. 90.

L'ho incontrato parimente fra i detriti accumulati dall'Arno sulle sue rive dopo le piene invernali; non è raro.

Questa conchiglietta si confonde facilmente col *Zonites crystallinus*, Müll.; ma ne diversifica perchè, presenta un maggior numero di giri ed ha l'ombellico più stretto e perfino, talvolta, ridotto a semplice depressione.

Genere IV. — **Helix**, Linneo.

1. Helix pygmæa, Draparnaud.

Helix pygmæa, Draparnaud (1801), Tabl. Moll., p. 93.

Non è raro nel territorio pisano, appiè degli alberi, nel terriccio umido; abbondante nelle alluvioni fluviali.

2. Helix obvoluta, Müller.

Helix obvoluta, Müller (1774), Verm. hist., II, p. 27.

L'ho raccolta in piccol numero frammezzo ai detriti rigettati dal mare sulla spiaggia del Gombo, presso Pisa; l'ho rinvenuta anche nel Fiorentino e nella Maremma toscana.

3. Helix hispana, Linneo.

Helix hispana, Linneo (1758), Syst. nat., ed. X, p. 772.
Helix planospira, Lamarck (1822) (partim), An. sans vert., VI.
Helix umbilicaris, Brumati (1838), Cat. conch. di Monfalcone.
Helix umbilicaris, Stabile (1864), Moll. terr. du Piémont, in *Atti* della Soc. it. di Sc. nat., VII, p. 55.

L'ho raccolta a Ripafratta sui monti lucchesi; vive sul Monte Pisano nella Grotta di Pozzuolo (Marcucci!), ai Bagni di Lucca (V. Uzielli!), sulle Alpi Apuane (Capellini!), nel Senese e nel Fiorentino. Non è abbondante in alcuna delle accennate località.

Gli esemplari provenienti dalla Toscana si riferiscono tutti alla var. *typica,* mutazione *italica,* del sig. Stabile.

Intorno alla denominazione di questa specie e di molte altre affini regnava testè una gran confusione; ma il sig. Stabile, nel suo libro sui Molluschi del Piemonte ha con molta perspicacia rettificati gli errori di nomenclatura, assegnato a ciascuna forma il posto che le conviene, e diradato ogni dubbio.

4. Helix cingulata, Studer.

Helix cingulata, Studer (1820), Kurz. Verzeichn, p. 14.

1. Var. *major*, De Betta e Martinati. Fu trovata ai Bagni di Lucca dal sig. V. Uzielli; non comune.
   La conchiglia è molto depressa ed assai grande:

diametro . . .	millimetri	30
altezza . . .	»	10

2. Var. *inornata*, Rossmässler. Abita colla varietà precedente (Uzielli); rara.
   La conchiglia manca della fascia bruna caratteristica che cinge ciascun giro di spira.
3. Var. *Apuana*, Issel. Abita le Alpi Apuane (Capellini!).
   In questa varietà la conchiglia offre la spira più elevata di quel che non sia nel tipo ed ha l'ombellico più piccolo; è anche più fortemente striata.

5. Helix pulchella, Draparnaud.

Helix pulchella, Draparnaud (1801), Tabl. Moll., p. 90.

Trovasi presso Pisa, nei luoghi umidi e freschi, sulle rive dei fossi, fra i muschi e sotto le pietre. Abbonda fra i detriti del Gombo e nelle alluvioni dell'Arno. L'ho ricevuta anche da Montecchio e da Firenze (D'Ancona).

6. Helix serpentina, Ferussac.

Helix serpentina, Ferussac (1822), Tabl. syst., p. 35.

Abita Pisa ed è abbondantissima sulle mura della città (1).

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(1) A Firenze, l'*Helix muralis*, Müll., sostituisce l'*H. serpentina*, Fer., ed è ugualmente abbondante sulle vecchie mura.

7. Helix vermiculata, Müller.

Helix vermiculata, Müller (1774), Verm. hist., II, p. 20.

Abbonda sulle colline pisane, nella Maremma Toscana, nonchè nella Val di Nievole.

1. Var. *campestris*, Moquin-Tandon; frequente.
2. Var. *expallescens*, Moquin-Tandon; non comune.
3. Var. *concolor*, Moquin-Tandon; molto comune a Monsumano e a Montecatini, nella Val di Nievole.
4. Var. *albida*, Moquin-Tandon; rara.

8. Helix nemoralis, Linneo.

Helix nemoralis, Linneo (1758), Syst. nat., ed. X, p. 773.

È molto abbondante in alcuni punti del territorio di Pisa; alle Cascine, nella macchia di S. Rossore, ai Bagni di S. Giuliano; l'ho pur trovata presso Cecina e nel Campigliese.

Gli esemplari di questa specie raccolti nel territorio pisano offrono una conchiglia di piccole dimensioni, solida, colla spira piuttosto elevata; la colorazione loro è variabilissima.

1. Var. *fasciata*, Moquin-Tandon; assai comune.
2. Var. *coalita*, Moquin-Tandon; comune.
3. Var. *interrupta*, Moquin-Tandon; non frequente.
4. Var. *lurida*, Moquin-Tandon; piuttosto rara.
5. Var. *unicolor*, Moquin-Tandon; non comune.
6. Var. *albina*, Moquin-Tandon; assai rara.

9. Helix aspersa, Müller.

Helix aspersa, Müller (1774), Verm. hist., II, p. 59.

Comunissima nella provincia pisana e nella lucchese nonchè in tutta Italia.

Ho osservato presso Pisa le seguenti varietà:

1. Var. *conoidea*, Moquin-Tandon; comune.
2. Var. *globosa*, Moquin-Tandon; abbondante.
3. Var. *virescens*, Moquin-Tandon; assai rara.
4. Var. *grisea*, Moquin-Tandon; rara.
5. Var. *zonata*, Moquin-Tandon; non comune.
6. Var. *obscurata*, Moquin-Tandon; non comune.

10. Helix lucorum, Müller.

Helix lucorum, Linneo (1758), Syst. nat., ed. X, p. 773.

Trovasi nei dintorni di Lucca; non la credo molto comune. Ne ho ricevuto anche alcuni esemplari da Firenze.

11. Helix aperta, Born.

Helix aperta, Born (1778), Ind. mus. Cœs. Vindob. Test., p. 399.
Helix naticoides, Draparnaud (1801), Tabl. Moll., p. 78.

È comunissima nei dintorni di Pisa e nella Maremma toscana.

1. Var. *brunnea,* Requien; comune.
2. Var. *viridis*, Requien; comune.
3. Var. *pallida*, Moquin-Tandon; rara.
4. Var. *major*, Moquin-Tandon; rara.

12. Helix rupestris, Studer.

Helix rupestris, Studer (1789), Faun. Helv., in Coxe's Travels in Switzerland, III, p. 430.
Helix umbilicata, Montagu (1803), Test. Brit., p. 434, t. XIII, f. 2.

Ne ho trovati pochi individui fra i detriti del Gombo, vicino a Pisa.

13. Helix rubella, Risso.

Helix rubella, Risso (1826), Hist. nat. Europ. mérid., IV, p. 75.
Helix Da Campo, Villa.

Questa specie che è ben distinta dalle sue congeneri fu erroneamente noverata da alcuni autori fra le varietà dell' *Helix cantiana*, Mont.

Il dottor Marcucci l'ha raccolta sulla Pania della Croce (Alpi Apuane). Come è noto, abita anche il Nizzardo e il Veronese.

14. Helix carthusiana, Müller.

Helix carthusiana, Müller (1775), Verm. hist. II, p. 15.
Helix carthusianella, Draparnaud (1801), Tabl. Moll., p. 86, e Hist. Moll., t. VI, f. 31, 32.

È comune nella provincia di Pisa, nei prati, sugli argini, in riva ai fossi, fra le erbe umide.

Gli individui tipici sono diafani, fragili; hanno l'apertura di color rossastro e presentano le seguenti dimensioni:

diametro . . .	millimetri	16
altezza	»	12

1. Var. *lactescens*, Moquin-Tandon; trovasi frequentemente nel Pisano e nella Maremma; è più piccola del tipo e biancastra.
2. Var. *minor*, Moquin-Tandon; (*Helix rufilabris*, Jeffreys); abita le praterie delle Cascine, presso Pisa, ed è assai più rara della precedente. Presenta l'apertura un poco più arrotondata di quel che non sia nel tipo, ed è di color giallastro. Le sue dimensioni sono:

diametro . . .	millimetri	8
altezza	»	5 $\frac{1}{2}$

15. Helix Olivieri, Ferussac.

Helix olivieri, Ferussac (1822), Tabl. syst., p. 47.
Helix olivieri, Pfeiffer (1848), Mon. Hel., I, p. 130.

L'ho trovata nella Val di Nievole, presso Montecatini, e nella Maremma toscana, non lungi da Cecina; sembra ugualmente rara nelle due località.

Questa chioccioletta, se la mia determinazione non è erronea, ha caratteri peculiari costanti, e merita di esser considerata come specie distinta dalla *Helix carthusiana*. Essa è globosa, sottile, diafana, longitudinalmente striata e di color giallo tendente al fulvo. La sua spira si compone di 6 giri accrescentisi con regolarità e separati da suture mediocremente profonde. L'apertura è arrotondata, un poco più larga che lunga; l'ombellico è chiuso; il margine destro della apertura è munito internamente di un orliccio. Qualche volta l'ultimo giro è ornato di una fascia pellucida lievemente accennata. Le dimensioni della conchiglia sono:

diametro . . .	millimetri	12 a 13
altezza	»	9 a 10

16. Helix cinctella, Draparnaud.

Helix cinctella, Draparnaud (1801), Tabl. Moll., p. 87 e Hist. Moll., t. VI, f. 28.

Abita Pisa; sta nei luoghi umidi, sotto le pietre, lungo le siepi.

1. Var. *fusca*, Moquin-Tandon; si incontra talvolta fra individui tipici.
2. Var. *fasciata*, Moquin-Tandon; vive colla precedente, ma è più comune.

17. Helix apicina, Lamarck.

Helix apicina, Lamarck (1822), Anim. sans vert., VI, p. 93.

Si trova nella macchia di S. Rossore; presso Pisa, in vicinanza del mare; non è comune.

18. Helix conspurcata, Draparnaud.

Helix conspurcata, Draparnaud (1801), Tabl. Moll., p. 93 e Hist. Moll., t. VII, f. 23-25.

L'ho raccolta spesse volte negli orti e nei giardini di Pisa, fra le erbe, sotto le pietre, nell' *humus*, ecc.

19. Helix unifasciata, Poiret.

Helix unifasciata, Poiret (1801), Prodr., p. 41.
Helix bidendata, Draparnaud (1801), Tabl. Moll., p. 85.

Si trova a Viareggio, nei campi aridi e sabbiosi, a poca distanza del mare.

20. Helix profuga, A. Schmidt.

Helix profuga, A. Schmidt (1854), in Malak. Blätter, p. 18.

È frequentissima nella provincia di Pisa, nella Maremma Toscana, e nella Val di Nievole.

Questa è evidentemente una forma meridionale della *Helix fasciolata*, Poir. (*H. striata*, Drap.); tuttavia, varii naturalisti autorevoli l'accettano come specie distinta a causa della sua estesa distribuzione geografica e per la costanza di alcuni caratteri poco importanti.

1. Var. *Etrusca*, Issel; abbonda sulle mura della città di Pisa. La conchiglia è più depressa del tipo, quasi sempre subcarenata, solida, munita di due o più fascie brune o fulve più o meno larghe. Questa conchiglia presenta molte sottovarietà di colorazione.
2. Var. *major*, Issel; abita Pisa e Firenze. Conchiglia più grande del tipo, ordinariamente di color fulvo uniforme; qualchevolta alquanto conoidea.

21. Helix neglecta, Draparnaud.

Helix neglecta, Draparnaud (1805), Hist. Moll., p. 108, t. VI, f. 12, 13.

L'ho raccolta, ma di rado, sulle colline pisane, nella Val di Nievole e a Firenze. Vive fra i cespugli, nei luoghi aridi.

1. Var. *vulgaris*, Moquin-Tandon; rara.
2. Var. *ochroleuca*, Moquin-Tandon; non comune.
3. Var. *fuscescens*, Moquin-Tandon; non comune.

22. Helix cespitum, Draparnaud.

Helix cespitum, Draparnaud (1801), Tabl. Moll., p. 92 e Hist. Moll., t. VI, f. 14, 15.

Abita sul Monte Pisano e si trova d'ordinario sui cespugli di cardo e d'altre piante; è piuttosto rara.

1. Var. *minor*, Moquin-Tandon; rara. Somiglia per la forma e le dimensioni all'*Helix candicans*, Ziegl.
2. Var. *trivialis*, Moquin-Tandon; non comune.
3. Var. *elegans*, Moquin-Tandon; rara.

23. Helix Pisana, Müller.

Helix Pisana, Müller (1774), Verm. hist., II, p. 70.
Helix rhodostoma, Draparnaud (1801), Tabl. Moll., p. 74.

Abbonda alle Cascine di Pisa e sulla spiaggia del Gombo.

1. Var. *albida*, Moquin-Tandon; comune.
2. Var. *maritima*, Moquin-Tandon; frequente.
3. Var. *Menkeana*, Moquin-Tandon; rara.
4. Var. *interrupta*, Moquin-Tandon; abbondante.
5. Var. *bifrons*, Moquin-Tandon; rara.
6. Var. *concolor*, Moquin-Tandon; non comune.

24. Helix variabilis, Draparnaud.

Helix zonaria, Donovan (1800), Brit. Shells, II, p. LXV; non Pennant (1777).
Helix variabilis, Draparnaud (1801), Tabl. Moll., p. 73.

Questa è una delle specie più abbondanti nel territorio pisano ed è insieme una delle più polimorfe. Si trova negli orti, nei campi, lungo le siepi.

1. Var. *fasciata*, Moquin-Tandon; piuttosto rara a Pisa, frequente a Firenze.
2. Var. *subalbida*. Moquin-Tandon; non comune.
3. Var. *lutescens*, Moquin-Tandon; comune.

25. Helix lineata, Olivi.

Helix lineata, Olivi (1799), Zool. Adriatica, p. 77.
Helix maritima, Draparnaud (1803), Hist. Moll., p. 85, t. V, f. 9, 10.

Vive sui terreni aridi e sabbiosi che trovansi fra la spiaggia del Gombo e la foce dell'Arno ed anche al principio del bosco di S. Rossore.

1. Var. *vittata*, Moquin-Tandon; abbondante.
2. Var. *maura*, Moquin-Tandon; non comune.
3. Var. *interrupta*, Moquin-Tandon; non rara.
4. Var. *lutescens*, Moquin-Tandon; frequente.

26. Helix pyramidata, Draparnaud.

Helix pyramidata, Draparnaud (1805), Hist. Moll., p. 80, t. X., f. 5, 6.

Abita i tomboli di Coltano, la spiaggia del mare, presso Livorno; non è comune.

1. Var. *sabulosa*, Moquin-Tandon (*H. sabulosa*, Ziegl.); non comune nei dintorni di Pisa.
2. Var. *fasciata*, Moquin-Tandon; è la varietà più abbondante.
3. Var. *monozona*, Moquin-Tandon; rara.
4. Var. *marmorata*, Moquin-Tandon; abita Livorno (Uzielli!).

27. Helix terrestris, Pennant.

Helix terrestris, Pennant (1777), Brit. Zool., p. 127, t. LXXX, f. 108.
Helix elegans, Draparnaud (1801), Tabl. Moll., p. 70.

Si trova presso Livorno, all'Ardenza (Uzielli!); ma è piuttosto rara.

28. Helix trochoides, Poiret.

Helix trochoides, Poiret (1789), Voy. Barb., II, p. 29.
Helix conica, Draparnaud (1801), Tabl. Moll., p. 69 e Hist. Moll., t. V, f. 3-5.

L'ho raccolta vicino a Pisa, sui monticelli di sabbia che si trovano in prossimità del piazzale delle Cascine.

29. Helix barbara, Linneo.

Helix barbara, Linneo (1758). Syst. nat., ed. X, p. 773.
Bulimus ventricosus, Draparnaud (1801), Tabl. Moll., p. 68 e Hist. Moll., t. IV, f. 31, 32.
Helix bulimoides, Moquin-Tandon (1855), Moll. de France, II, p. 277.

È comune nelle vicinanze di Pisa, sulle rive dell'Arno, fuori di Porta alle Piaggie; presso Calci, presso Agnano; si trova spesso sul tronco dei platani; sul cespite delle piante che crescono nei luoghi freschi ed ombrosi.

1. Var. *fasciata*, Moquin-Tandon; comune.
2. Var. *Astieri*, Moquin-Tandon; comune.

30. Helix acuta, Müller.

Helix acuta, Müller (1774), Verm. hist., II, p. 100.
Turbo fasciatus, Pennant (1777), Brit. Zool., ed. IV, p. 131, t. LXXXII, f. 119.
Bulimus acutus, Bruguière (1789), Enc. meth., I, p. 323.

Si trova comunemente nei campi e nei prati, sulle rive dell'Arno, presso Pisa.

1. Var. *unifasciata*, Moquin-Tandon; abbondante.
2. Var. *strigata*, Moquin-Tandon; non comune.
3. Var. *elongata*, Cristofori e Jan; rara.

Genere V. — **Bulimus**, Scopoli.

1. Bulimus decollatus, Linneo.

Helix decollata, Linneo (1758), Syst. nat., ed. X, p. 773.
Bulimus decollatus, Bruguière (1789), Enc. meth., I, p. 326.

L'ho raccolto a Pisa, sulla piazza del duomo; si trova anche sul Monte Pisano, nella Maremma, all'Isola d'Elba, ecc., vive nei luoghi aridi e sassosi.

2. Bulimus tridens, Müller.

Helix tridens, Müller (1774), Verm. hist., II, p. 106.
Pupa tridens, Draparnaud (1801), Tabl. Moll., p. 60.

Le spoglie di questa specie sono abbondanti nelle alluvioni dell'Arno; l'ho trovata qualche volta vivente sul Monte Pisano e a Montecatini nella Val di Nievole.

1. Var. *unidentatus*, Issel; abita S. Giuliano ove si trova molto di rado. Conchiglia a spira alquanto breve, ordinariamente fulva e subdiafana, colla apertura munita di un sol dente posto in mezzo della parete aperturale.

lunghezza . . .	millimetri	10
diametro . . .	»	4 $\frac{1}{2}$

2. Var. *major,* Menke; non comune.

3. Bulimus quadridens, Müller.

Helix quadridens, Müller (1774), Verm. hist., II, p. 107.
Bulimus quadridens, Bruguière (1792), Enc. meth., I, p. 351.

È frequente nelle alluvioni dell'Arno e fra i detriti rigettati dal mare sulla spiaggia del Gombo, presso Pisa; trovasi a Monte Calvi nella Maremma Pisana (Marcucci!).

4. Bulimus subcylindricus, Linneo.

Helix subcylindrica, Linneo (1767), Syst. nat., ed. XII, p. 1248.
Helix lubrica, Müller (1774), Verm. hist., II, p. 104.
Bulimus subcylindricus, Moquin-Tandon (1855), Moll. de France, II, p. 304.

Vive nella macchia di S. Rossore nell'*humus* che sta fra le radici delle quercie; poco abbondante.

Questa specie è una delle più diffuse sulla superficie del globo. Abita non solo tutta l'Europa, ma ancora l'Affrica settentrionale, l'Asia centrale, e gli Stati Uniti d'America; recentemente il marchese Doria la trovò anche in Persia.

Genere VI. — **Cæcilianella**, Bourguignat.

1. Cæcilianella acicula, Müller.

Buccinum acicula, Müller (1774), Verm. hist., II, p. 150.
Cæcilianella acicula, Bourguignat (1856), Amén. Malac., p. 215, t. XVIII, f. 1-3.

Abbonda nelle posature dell'Arno; l'ho anche incontrata qualche volta nelle anfrattuosità delle vecchie mura, nel territorio pisano.

2. Cæcilianella aciculoides, Jan.

Columna aciculoides, Jan (1832), Mantissa, p. 2.
Achatina aciculoides, L. Pfeiffer (1848), Mon. Hel., II, p. 274.
Cæcilianella aciculoides, Bourguignat (1856), Amén, malac., p. 222.

L'ho trovata in piccolo numero, nelle alluvioni dell'Arno. Gli esemplari raccolti in Toscana sono perfettamente uguali a quelli della Lombardia e del Piemonte.

Insieme alle due suaccennate specie ve ne ha una terza che non è rara nelle posature dell'Arno. Questa è simile, ma non identica alla *Cæcilianella Liesvillei*, Bourg, e non mi è riuscito ancora determinarla.

Genere VII. — **Clausilia**, Draparnaud.

1. Clausilia laminata, Montagu.

Helix bidens, Müller (1774), Verm. hist., II, p. 116.
Turbo laminatus, Montagu (1803), Test. Brit., p. 359, t. II, f. 4.
Clausilia laminata, Turton (1831), Brit. Moll., p. 70.

Di questa *Clausilia*, che è molto sparsa in Toscana, ho trovati alcuni esemplari a Pisa nelle alluvioni dell'Arno; la ricevetti anche da Firenze (D'Ancona) e da Siena (Pecchioli).

1. Var. *major*, D'Ancona (in scheda). Abita la Maremma Toscana presso S. Vincenzo; non comune.

2. Clausilia alboguttulata, Wagner.

Clausilia alboguttulata, Wagner (1829), in Chemnitz, Neue Conch. Cabinet, XII, p. 191 (non *C. alboguttulata*, Pfeiffer).
Clausilia punctata, Michaud (1831), Compl., p. 55, t. XV, f. 23.
Clausilia albopustulata, De Cristofori e Jan (1832), Mantissa.

Nei dintorni di Lucca ne ho raccolti molti individui che si accostano assai agli esemplari tipici di Lombardia. In altri luoghi assume forme diverse che costituiscono delle varietà ben distinte.

1. Var. *obesa*, Issel; l'ho trovata sulle mura rovinate di un antica torre, nel Lucchese; abbondante. La conchiglia è cornea, bruna, più grande e più larga del tipo; presenta delle rughe longitudinali brevemente segnate e papille poco numerose; l'apertura è piuttosto ampia. Dimensioni:

lunghezza . . .	millimetri	20
diametro . . .	»	$5\frac{1}{2}$

2. Var. *nigra*, Pecchioli (in scheda); ne conservo nella mia raccolta vari esemplari del Volterrano comunicatimi dal sig. Pecchioli, naturalista fiorentino, ed altri raccolti a Poggio a Monti sopra Pomarance dal mio amico dottor A. Della Valle. Conchiglia di color bruno scuro, quasi nera, snella, grande, fornita di rughe longitudinali più forti che nella varietà precedente. Dimensioni:

lunghezza .	millimetri	19 a 21
diametro .	»	$4\frac{3}{4}$ a 5

3. Clausilia bidens, Linneo.

Turbo bidens, Linneo (1758), Syst. nat., ed. X, p. 767.
Helix papillaris, Müller (1774), Verm. hist., II, p. 120.

Abbonda a Pisa, a Viareggio, a Lucca, a Livorno, a Firenze, all'isola d'Elba e si trova d'ordinario insieme alla *Pupa quinquedentata*, Born, e colla *Clausilia solida*, Drap.

4. Clausilia solida, Draparnaud.

Strombiformis perversus, Da Costa (1778), Test. Brit., p. 107, t. VIII, f. 15.
Clausilia solida, Draparnaud (1805), Hist. Moll., p. 69, t. IV, f. 8, 9.

È molto comune a Pisa; trovasi meno abbondantemente in altre località della Toscana.

Genere VIII. — **Pupa**, Lamarck.

1. Pupa quinquedentata, Born.

Turbo quinquedentata, Born. (1778), Mus. Vindob., test., p. 370.
Pupa cinerea, Draparnaud (1801), Tab. Moll., p. 61 e Hist. Moll., t. III, f. 53.
Pupa quinquedentata, Deshayes (1838), in Lamarck, An. sans vert., VIII, p. 174.

Specie copiosissima sulle mura e sulle roccie nei luoghi aridi, a Pisa, a Livorno, nella Maremma toscana, ecc.

1. Var. *Variegella*, Cristofori e Jan; si trova qualche volta a Pisa fra gli individui del tipo; comune alla sommità della Pania della Croce (Marcucci!).
2. Var *minor*, Moquin-Tandon; l'ho rinvenuta a Pisa; rara.
3. Var. *Juliana*, Issel; abita ai bagni di S. Giuliano. Presenta un colore rossiccio più o meno intenso dovuto, a quanto credo, ai materiali ferruginosi che abbondano in quella località.

2. Pupa avenacea, Bruguière.

Bulimus avenaceus, Bruguière (1792), Enc. meth., VI, p. 355.
Pupa avena, Draparnaud (1801), Tabl. Moll., p. 59, e Hist. Moll., t. III, f. 47, 48.
Pupa avenacea, Moquin-Tandon (1855), Moll. de France, II, p. 257.

L'ho rinvenuta una sola volta nelle posature dell'Arno.

1. Var. *Apuana*, Issel; è discretamente abbondante alla punta del Sagro sulle Alpi Apuane (Marcucci!). Questa varietà è analoga alla *P. hordeum*, Studer; ma ne differisce per la forma dell'apertura. La conchiglia è più piccola di quel che non sia nel tipo, di color bruno e offre il margine destro dell'apertura più regolarmente arcuato.

3. Pupa frumentum, Draparnaud.

Pupa frumentum, Draparnaud (1802), Tabl. Moll., p. 50 e Hist. Moll., t. III, f. 51, 52.

Non è rara sul Monte Pisano, a Fauglia, a Crespine, nella Maremma Toscana; le sue spoglie sono comuni fra i detriti depositati dai fiumi e dai canali.

1. Var. *curta*, Issel (var. *a*, Porro); si trova nelle posature dell'Arno. Conchiglia piccola, ventricosa, breve, colla apertura quasi triangolare.

4. Pupa granum, Draparnaud.

Pupa granum, Draparnaud (1801), Tabl. Moll., p. 50. e Hist. Moll., t. III, f. 45, 46.

Non è rara fra i detriti apportati dall'Arno e fra quelli accumulati sulla spiaggia del Gombo.

5. Pupa Philippii, Cantraine.

Pupa Philippii, Cantraine (1840), Malac. Medit., p. 140.
Pupa Caprearum, Philippi (1844), Moll. Siciliæ, II, p. 114, t. XXI, f. 3.
Pupa Philippii, Rossmässler (1842), Iconogr., XI, p. 11, f. 729.
Pupa Savi, de Charpentier (in varie collez.).

Questa specie, che abita la Sicilia, la Dalmazia e il Montenegro, è abbondantissima sulle mura di cinta della città di Pisa, particolarmente nelle parti che guardano il mezzogiorno.

6. Pupa biplicata, Michaud.

Pupa biplicata, Michaud (1831), Compl., p. 62, t. XV, f. 33, 34.
Pupa Ferrari, Porro (1838), Malac. Com., p. 57, t. I, f. 4.

Si trova nelle posature dell'Arno; non comune.

1. Var. *elongata*, Porro; l'ho raccolta raramente fra gli esemplari del tipo.

7. Pupa umbilicata, Draparnaud.

Pupa umbilicata, Draparnaud (1801), Tabl. Moll., p. 58 e Hist. Moll., t. III, f. 39, 40.
Pupa cylindracea, Moquin-Tandon (1855), Moll. de France, II, p. 390.

Ne ho rinvenuti parecchi esemplari a Pisa sopra un ippocastano del giardino botanico; è assai più abbondante a Firenze nel giardino di Boboli.

1. Var. *gracilis*, Issel; ne ho trovato un esemplare nel giardino botanico di Pisa e un altro fra i depositi fluviali del Gombo. La conchiglia è più piccola, più allungata del tipo e meno attenuata alla sommità. Dimensioni:

lunghezza . . .	millimetri	$3\frac{1}{4}$
diametro . . .	»	$1\frac{1}{2}$

8. Pupa muscorum, Linneo.

Pupa muscorum, Linneo (1758), Syst. nat., ed. X, p. 767.
Pupa marginata, Draparnaud (1801), Tabl. Moll., p. 58 e Hist. Moll., t. III, f. 36-38.

Si trova, ma raramente, fra le posature dell' Arno.

1. Var. *edentula*, Moquin-Tandon (Var. *a*, Menke); abita il giardino botanico di Pisa, e vive colla specie precedente; rara.

Genere IX. **Vertigo**, Müller.

1. Vertigo pygmæa, Draparnaud.

Vertigo pygmæa, Draparnaud (1801), Tabl. Moll., p. 57.
Vertigo similis, Ferussac (1822), Tabl. syst., p. 68.
Alæa vulgaris, Jeffreys (1830), Trans. Linn. Soc., XVI, p. 359.

Si trova frequentemente fra i detriti dell' Arno. Ne posseggo pure parecchi individui raccolti a Montecchio (Uzielli) e a Firenze (D' Ancona).

2. Vertigo vertigo, Montagu.

Turbo vertigo, Montagu (1803), Test. Brit., p. 363, t. XII, f. 6.
Vertigo Venetzii, de Charpentier (1822), in Ferussac, Tabl. syst., p. 65 (senza caratteri).
Vertigo angustior, Jeffreys (1830), Trans. Linn. Soc., XVI, p. 361.
Vertigo nana, Michaud (1831), Compl., p. 71, t. XV, f. 24, 25.
Vertigo hamata, Held (1837), in Isis., p. 304.
Vertigo plicata, A. Müller (1838), Wieg. Arch., p. 210, t. IV, f. 6.

Abita Pisa; l' ho raccolto in un prato a destra del viale delle Cascine. — Si trova anche a Firenze (D' Ancona).

3. Vertigo muscorum, Draparnaud.

Pupa muscorum, Draparnaud (1801), Tabl. Moll., p. 56.
Pupa minuta, Studer (1820), Kurz. Verzeichn., p. 89.
Pupa minutissima, Hartmann (1821), in Neue Alp., p. 220, t. II, f. 5.
Vertigo cylindrica, Ferussac (1822), Tabl. syst., p. 68.

Le spoglie di questa piccola specie si incontrano frequentemente nelle alluvioni dei fiumi e dei canali della Provincia di Pisa; abita anche Firenze (D'Ancona!).

Genere X. — **Carychium**, Müller.

1. Carychium tridentatum, Risso.

Seraphia tridentata, Risso (1826), Hist. nat. Nice, IV, p. 84.
Carychium nanum, Anton (1839), Verzeichn. der Conch., p. 48.
Carychium minimum, var., L. Pfeiffer (1841), in Viegm. Arch., p. 224.
Carychium elongatum, A. e G. B. Villa (1841), Disp. Conch., p. 59.
Carychium tridentatum, Bourguignat (1857), Amén. malac., II, p. 44, t. XV, f. 12, 13.

Ho osservato questa specie vivente nella macchia di S. Rossore in mezzo all'*humus* alla base di vecchie quercie.

Genere XI. — **Conovulus**, Lamarck.

1. Conovulus myosotis, Draparnaud.

Auricula myosotis, Draparnaud (1801), Tabl. Moll., p. 53.

Ne conservo nella mia collezione un esemplare raccolto sulla spiaggia del Marzocco, presso Livorno, dal mio amico V. Uzielli.

2. Conovulus Firminii, Payraudeau.

Auricula Firminii, Payraudeau (1826), Moll. Cors., p. 105, t. V, f. 9, 10.

Si trova pur, ma raramente, sulla spiaggia del Marzocco, vicino al porto di Livorno.

Genere XII. — **Planorbis**, Guettard.

1. Planorbis fontanus, Lightfoot.

Helix fontana, Lightfoot (1786), in Phil. trans. Roy. Soc., LXXVI, p. 165, t. II, f. 1.
Planorbis complanatus, Draparnaud (1805), Hist. Moll., p. 47, t. II, f. 20-22.

Ho rinvenuto questa rara e bella conchiglietta in un piccolo canale ingombro di piante acquatiche che si trova a poca distanza dalla antica stazione della ferrovia Lucchese, presso Pisa.

2. Planorbis complanatus, Linneo.

Helix complanata, Linneo (1758), Syst. nat., ed. X, p. 769.
Planorbis umbilicatus, Müller (1774), Verm. hist., II, p. 160.

È abbondantissimo in tutti i fossi e nelle paludi dell'agro Pisano, nonchè nel lago di Bientina e nella Maremma Toscana.

3. Planorbis carinatus, Müller.

Helix planorbis, Linneo (1758), Syst. nat., ed. X, p. 769.
Planorbis carinatus, Müller (1774), Verm. hist., II, p. 175.

Riferisco a questa specie un *Planorbis* meno comune del precedente che si trova in molte località della provincia di Pisa.

Gli esemplari trovati nelle vasche dell'orto botanico sono quasi identici al tipo; quelli invece che abitano certi canali presso i bagni di S. Giuliano assumono una forma intermedia fra il *P. complanatus*, Linn. ed *P. carinatus*, Müll., avvicinandosi più a questo che a quello. Finalmente, alcuni individui si accostano assai al *P. subangulatus*, Philippi.

4. Planorbis spirorbis, Linneo.

Helix spirorbis, Linneo (1758), Syst. nat., ed. X, p. 770.

Non è raro in un piccolo fosso, spesse volte a secco, che si trova, presso Pisa, lungo lo stradone delle Cascine, a mano destra.

5. Planorbis albus, Müller.

Planorbis albus, Müller (1774), Verm. hist., II, p. 164.

Si trova frequentemente insieme alla specie suaccennata nonchè in altri canali. Spesso l'ho veduto agglutinato con altre conchiglie dalle larve di friganee.

6. Planorbis corneus, Linneo.

Helix cornea, Linneo (1758), Syst. nat., ed. X, p. 770.

Abbonda in tutte le acque stagnanti della provincia pisana.

1. Var. *adelosius*, Issel (P. adelosius, Bourg.); abita a Pisa ed è piuttosto frequente nei piccoli canali. Questa varietà e la seguente sono collegate col tipo da un gran numero di forme intermedie.
2. Var. *niger*, Issel; l'ho raccolta nelle vasche del giardino botanico di Pisa; rara. Conchiglia piuttosto depressa, perfettamente nera, non lucida, di piccole dimensioni.

Genere XIII. — **Physa**, Draparnaud.

1. Physa fontinalis, Linneo.

Bulla fontinalis, Linneo (1758), Syst. nat., ed. X, p. 727.

Si raccoglie in quasi tutti i fossi del territorio pisano, nonchè nella palude di Bientina. L'ho osservata più volte galleggiante alla superficie dell'acqua col piede rivolto in alto.

2. Physa Pisana, Issel.

Testa sinistrorsa ovato-oblonga, inflata, tenuissima, pellucida, colore succinea, nitida, longitudinaliter striatula; — spira elata, apice obtusiusculo; — anfractibus 5 $\frac{1}{2}$ convexiusculis sutura impressa separatis; ultimo magno, inflato, $\frac{2}{3}$ altitudinis superante; — apertura oblonga; — columella simplice obliqua, vix torta; — peristomate simplice, tenuissimo.

Altit. . . .	millim.	24
Diam.	»	8

Questa specie che non esito a dichiarar nuova, fu raccolta dal mio amico e compagno di studii C. Gentiluomo, poi da me, in un fosso poco distante dalla Porta a Lucca, presso a Pisa; la credo piuttosto rara.

La conchiglia è sinistrorsa, ovata, oblunga, alquanto rigonfia, assai fragile, pellucida, color d'ambra, nitida e striata minutamente nel senso longitudinale; — la spira è snella, l'apice un poco ottuso. I giri sono nel numero di 5 $\frac{1}{2}$, alquanto convessi e divisi da suture ben segnate, l'ultimo è ampio e rigonfio e supera i $\frac{2}{3}$ dell'altitudine totale. L'apertura è oblunga; la columella è semplice, obliqua ed un poco torta; il peristoma è semplice e molto sottile.

La conchiglia sopradescritta ha qualche analogia colla *Physa Taslei*, Bourg. (1), della Brettagna e colla *P. fontinalis*, Drap. Dalla prima si distingue facilmente per-

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(1) J. R. Bourguignat, *Malacologie terrestre et fluviatile de la Bretagne*, 1860; p. 70.

chè è più allungata, meno rigonfia e più grande e perchè la sua apertura è più stretta e supera in altezza i $\frac{2}{3}$ della altitudine totale; dalla seconda differisce per aver l'apice meno ottuso, la spira notevolmente più elevata e l'ultimo giro meno rigonfio; l'apertura offre inoltre forma diversa ed altezza minore.

Genere XIV. **Limnæa**, Bruguière.

1. Limnæa auricularia, Linneo.

Helix auricularia, Linneo (1758), Syst. nat., ed. X, p. 174.
Limneus auricularius, Draparnaud (1801), Tabl. Moll., p. 48.

Si trova, ma non frequentemente, nei fossi che fiancheggiano la ferrovia Lucchese, presso Pisa. Gli individui che ho osservati sono piuttosto voluminosi e presentano una conchiglia munita di forti rughe longitudinali e traversali come quelli della var. *collisa*, Moquin-Tandon; l'ultimo giro non è molto rigonfio ed il labbro non è esteso.

A Pistoia, nella villa Puccini, v'ha una varietà più piccola e più somigliante al tipo.

2. Limnæa limosa, Linneo.

Helix limosa, Linneo (1758), Syst. nat., ed. X, p. 774.
Limneus ovatus, Draparnaud (1805), Hist. Moll., p. 50, t. II, f. 30, 31.

Si trova comunemente a Pisa e nei luoghi circonvicini.

3. Limnæa stagnalis, Linneo.

Helix stagnalis, Linneo (1758), Syst. nat., ed. X, p. 774.
Limneus stagnalis, Draparnaud (1801), Tabl. Moll., p. 51.

Abita parecchi canali, fossi e paludi nel territorio pisano; non è abbondante.

1. Var. *subfusca*, Moquin-Tandon (var. *B*, Goupil); ne ho raccolti molti esemplari nelle vaschette ove si coltivano le piante acquatiche nell'orto botanico di Pisa; comune.

4. Limnæa palustris, Müller.

Buccinum palustre, Müller (1774), Verm. hist., II, p. 131.
Limneus palustris, Draparnaud (1801), Tabl. Moll., p. 50.

Abbonda in tutte le acque stagnanti dell'agro pisano. Alcuni individui raccolti a Pisa si riferiscono, credo, alla var. *fusca*, Moquin-Tandon. (*Limneus fuscus*, C. Pfeiffer.)

5. Limnæa truncatula. Müller.

Bucinum truncatulum, Müller (1774), Verm. hist., II, p. 130.
Limneus minutus, Draparnaud (1801), Tabl. Moll., p. 51.

Abita i Bagni di Lucca (Uzielli!) e la provincia di Firenze (D'Ancona!); probabilmente vive anche nella regione montuosa della provincia pisana.

Genere XV. — **Ancylus**, Geoffroy.

1. Ancylus Janii, Bourguignat.

Ancylus capuloides, Jan (1838), in Porro, Malac. com., p. 87, t. I, f. 7.
Ancylus Janii, Bourguignat (1853), Cat. Ancyl., in Journ. Conch., p. 370, f. 14, 15.
Ancylus fluviatilis, var. *capuliformis*, Moquin-Tandon (1855), Moll. de France, II, p. 484, t. XXXVI, f. 7.

Si trova ai Bagni di Lucca (Uzielli!).

2. Ancylus gibbosus, Bourguignat.

Ancylus gibbosus, Bourguignat (1853), Cat. Ancyl., in Journ. Conch., p. 186.

Questa specie mi fu comunicata dal mio amico sig. V. Uzielli che la raccolse ai Bagni di Lucca. Il dottor Marcucci l'ha rinvenuta a Campi nel Casentino.

3. Ancylus costulatus, Küster.

Ancylus costulatus, Küster (1839), in Anton, Verzeichn Conch., p. 26.

È copiosissimo in un ruscelletto, presso Montecatini (Val di Nievole). Differisce un poco dal tipo predominante in Liguria per esser più appianato e di color bruno scuro.

4. Ancylus lacustris, Linneo.

Patella lacustris, Linneo (1758), Syst. nat., ed. X, p. 783.
Ancylus lacustris, Müller (1774), Verm. hist., II, p. 199.

Abita nei grandi fossi del territorio pisano ove l'acqua è quasi stagnante (Uzielli!); ma colà è assai raro; nel lago di Massaciuccoli presso Massa (Uzielli!). L'ho raccolto

nella palude di Bientina, ove si trova aderente alle valve disgiunte di *Anodonta*, e l'ho ricevuto da Firenze (Pecchioli).

Genere XVI. — **Cyclostoma**, Draparnaud.

1. Cyclostoma elegans, Müller.

Nerita elegans, Müller (1774), Verm. hist., II, p. 177.
Cyclostoma elegans, Draparnaud (1801), Tabl. Moll., p. 38.

È frequentissimo nelle provincie toscane, segnatamente sulle colline di Pisa.

Genere XVII. — **Pomatias**, Hartmann.

1. Pomatias patulum, Draparnaud (1).

Cyclostoma patulum, Draparnaud (1801), Tabl. Moll., p. 39 e Hist. Moll., I, f. 9-11.
Pomatias patulum, Cristofori e Jan (1832), Cat., p. 15.

1. Var. *montanus*, Issel. Il dottor Marcucci esplorando le Alpi Apuane per attendere a ricerche botaniche, trovò parecchi esemplari di questa conchiglia sulla sommità della Pania della Croce. — Conchiglia più piccola e più turricolata del tipo, sottilmente striata nel senso longitudinale; peristoma poco esteso. Dimensioni:

lunghezza . .	millimetri	$6\frac{1}{2}$ a 7
diametro . .	»	$2\frac{3}{4}$ a 3

Genere XVIII. — **Bythinia**, Gray.

1. Bythinia tentaculata, Linneo.

Helix tentaculata, Linneo (1758), Syst. nat., ed. X, p. 774.
Cyclostoma impurum, Draparnaud (1801), Tabl. Moll., p. 41.

Abita quasi tutte le acque stagnanti del Pisano, nonchè quelle del Pistojese, la palude di Bientina, ecc.

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(1) Sarebbe anche da noverarsi nella famiglia dei Ciclostomi una specie del genere *Acme* trovata dal signor V. Uzielli fra i detriti del Gombo, presso Pisa.

1. Var. *codia*, Issel (*Bythinia codia*, Bourg.); si trova a Pisa e a S. Giuliano. Piuttosto che una varietà potrebbe dirsi una modificazione accidentale.
2. Var. *producta*, Menke; non comune.
3. Var. *ventricosa*, Menke; non comune.

2. Bythinia Boissieri, de Charpentier.

Bythinia Boissieri, Bourguignat, in Litt.

Assegno dubitativamente questa denominazione ad una conchiglietta fluviatile frequente nei dintorni di Pisa e alla Spezia, la quale è analoga per le forme e la dimensione alla *B. tentaculata*, Lin., ma che ne differisce notevolmente per aver la spira più allungata, i giri più convessi e le suture più profonde. Il sig. Bourguignat, cui l'ho comunicata, la crede identica alle *B. Boissieri* di Sicilia. Il sig. Stabile all'incontro mi scrisse che la vera *B. Boissieri* ha l'apertura più ampia e i giri meno arrotondati, e considera le specie di Pisa come nuova. Io non sono in grado di giudicare qual sia fra le due opinioni quella da preferirsi.

3. Bythinia Lucensis, Stabile.

Bithinia Lucensis, Stabile, in Litt.

Fu copiosamente raccolta dal sig. V. Uzielli ai Bagni di Lucca.

Questa piccola specie, dichiarata nuova dal sig. Stabile, offre una conchiglia ovata oblunga, di color corneo chiaro, pellucida, munita di sottilissime strie longitudinali soltanto visibili col mezzo di una forte lente; l'apice è ottuso; i giri sono nel numero di 4 $\frac{1}{2}$, separati da profonde suture; i primi, che sono alquanto stretti, appariscono neri, perchè lasciano scorgere per trasparenza il corpo dell'animale; l'ultimo è grande rigonfio e supera in altezza la metà dell'altitudine totale. L'apertura è arrotondata, quasi angolosa superiormente, un poco più lunga che larga; il margine destro è regolarmente arcuato; il sinistro è meno curvo del destro; il peristoma è continuo e semplice; la columella è spessa ed un poco obliqua; l'ombellico è ridotto ad una stretta fessura. L'opercolo è posto molto profondamente nella conchiglia; è sottile, di color bruno, a nucleo eccentrico e presenta strie concentriche. Dimensioni:

lunghezza . . .	millimetri	2
diametro	„	1 $\frac{1}{2}$

Questa specie somiglia un poco alla *B. anatina* Drap., ma ne differisce perchè la sua apertura è meno rotonda, la sua spira meno elevata e perchè ha i giri più rigonfii e minori dimensioni. Si distingue a prima vista dalla *B. similis*, Drap. perchè i suoi giri sono più convessi, le suture più profonde e la sua spira meno elevata; offre inoltre dimensioni tre volte minori.

4. Bythinia Saviana, Issel.

Testa minima, rimato-perforata, ovato-elongata, solida, sub lente subtilissime striata, pallide cornea vel luteola; — apice obtusiusculo; — anfractibus 5 $\frac{1}{2}$ convexis, regulariter crescentibus, sutura impressa profunde separatis; ultimo $\frac{2}{5}$ longitudinis æquante; — apertura ovato rotundata; peristomate continuo, acuto, extus marginato; margine columellari arcuato.

Altit. . . . . millim. $2\frac{1}{2}$
Diam. . . . . » 1

Questa *Bythinia*, cui ho assegnato il nome del mio venerato maestro Paolo Savi, abita nelle acque termali acidulo-ferruginose de' bagni di S. Giuliano presso Pisa. Si trova abbondantemente vicino alle scaturigini della fossa calda, aderente alle pietre e alle alghe sommerse, a piccola profondità.

La conchiglia di essa specie è piccolissima, munita di sottil fessura ombellicale, ovata, allungata, debolmente nitida, solida, minutamente striata nel senso longitudinale, di color corneo o giallastro, spesso inquinata di sostanze estranee. I giri della spira sono 5 $\frac{1}{2}$, convessi, accrescentisi regolarmente e divisi da profonde suture (1); l'ultimo occupa circa $\frac{2}{5}$ della altezza totale. L'apertura offre dimensioni mediocri ed è quasi rotonda; il suo diametro longitudinale supera di poco il trasversale. Il peristoma è acuto e continuo; negli individui adulti presenta esternamente un piccolo orliccio, raramente due; il margine columellare è arcuato. L'opercolo è piccolo, trasparente e notevolmente approfondato nell'interno della conchiglia.

La *Bythinia Saviana* è sparsa in Toscana in varie raccolte private, sotto il nome di *B. thermalis* (Linneo); determinazione affatto erronea, imperocchè la vera *B. thermalis* (che è la *B. Aponensis* di Martens) la quale vive soltanto nelle acque termali di Abano nel Padovano, è specie affatto diversa della mia e spettante ad altro gruppo, a quello cioè che taluni naturalisti distinguono col nome generico di *Hydrobia*.

La mia specie presenta qualche analogia colla *B. marginata*, Michaud (2), che trovasi in Francia ed in Svizzera; ma non si può confondere con essa, perchè è più lunga, più snella ed acuminata, e perchè ha i giri meglio distinti l'uno dall'altro.

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(1) Le suture osservate con forte ingrandimento appariscono, in quasi tutti gli individui, marginate; peraltro questo carattere è poco manifesto.

(2) Michaud (1831), Compl., p. 91, t. XVI, f. 58, 59.

Genere XIX. — **Paludina** Lamarck.

1. Paludina contecta, Millet.

Nerita vivipara. Müller (1774), Verm. hist., II, p. 182.
Cyclostoma contectum, Millet (1813), Moll. Main. et Loir., p. 5.

Si trova comunemente nei fossi dei dintorni di Pisa, segnatamente lungo la ferrovia che conduce a Lucca.

Genere XX. — **Valvata**, Müller

1. Valvata piscinalis, Müller.

Nerita piscinalis, Müller (1774), Verm. hist., II, p. 172.

S'incontra spesse volte nei canali e nei fossi poco profondi della provincia pisana; vive d'ordinario in numerose società ed immersa nella melma.

2. Valvata cristata, Müller.

Valvata cristata, Müller (1774), Verm. hist., II, p. 198.
Valvata planorbis, Draparnaud (1801), Tabl. Moll., p. 42.

Abita fra le piante acquatiche ne' piccoli canali dell'agro pisano, alle Cascine, a S. Rossore, ecc.; meno comune della precedente.

Genere XXI. — **Melanopsis**, Ferussac.

1. Melanopsis Dufourii, Ferussac.

Melanopsis Dufourii, Ferussac (1823), Monog. des Melanop., in Mém. de la Soc. d'Hist. nat. de Paris, p. 153, t. 8, f. 5.

Ho fatto ampia raccolta di questa specie nella Maremma Toscana in un fiumicello d'acqua calda detto Caldana di Ravi, presso Campiglia; vive sulla sabbia, ove l'acqua ha soltanto pochi centimetri di profondità. Il mio amico V. Uzielli ed io abbiam tentato di acclimarla nelle acque termali di S. Giuliano la cui temperatura differisce poco da quella della Caldana di Ravi; ma credo che l'esperienza non sia riuscita.

1. Var. *elata*, Issel; si trova insieme al tipo ed è rarissima. Offre dimensioni doppie di quelle degli individui tipici; è alquanto allungata e presenta una sorta d'orliccio rilevato in prossimità di ciascuna sutura (1).

Genere XXII — **Theodoxus**, De Montfort.

1. Theodoxus fluviatilis, Linneo.

Nerita fluviatilis, Linneo (1758), Syst. nat., ed. X, p. 177.
Theodoxus Lutetianus, De Montfort (1810), Conch. Syst., II, p. 351.
Neritina fluviatilis, Lamarck (1822), An. sans vert., VI., p. 188.

Questa conchiglietta abbonda nell'Arno, nei punti ove il corso del fiume è assai rapido, ed in vari canali che irrigano l'agro pisano, segnatamente nel canale macinante e nelle sue derivazioni; vive aderente alle pietre ove l'acqua è limpida e poco profonda. Nell'Arno si trova una varietà di colorazione verdastra unicolore; nei canali paralleli allo stradone di S. Giuliano ve ne ha una ornata di lineole e macchie brune sopra un fondo verdastro.

1. Var. *thermalis*, Moquin-Tandon (*Neritina thermalis*, Boubée). Abita il canale d'acqua calda di S. Giuliano. È più piccola e più globosa del tipo.

2. Theodoxus Prevostianus, Partsch.

Nerita Prevostiana, Partsch (1828), in C. Pfeiffer, Deutsch. Moll., III, p. 49, t. VIII, f. 11, 12 (non Dupuy).

L'ho trovata soltanto nella Caldana di Ravi colla *Melanopsis Dufourii*; non è molto abbondante.

Sebbene alcuni autori e fra gli altri Moquin-Tandon non ammettano questa come buona specie, pure a me pare ben distinta dalle sue congeneri e fornita di caratteri peculiari sufficientemente costanti.

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(1) Nella ricca collezione del signor Cesare D'Ancona ho veduto una varietà di questa specie, proveniente da Montioni, che presenta l'ultimo giro distintamente carenato.

MOLLUSCHI ACEFALI

Genere I. — **Anodonta**, Lamarck.

1. Anodonta cygnea, Linneo.

Mytilus cygneus, Linneo (1758), Syst. nat., ed. X, p. 706.

Abita il lago di Massaciuccoli (Uzielli).

1. Var. *Cellensis*, Moquin-Tandon (*Mytilus Zellensis,* Gmelin); abbonda in tutti gli stagni della Toscana e segnatamente nelle palude di Bientina ove in meno di due ore ne ho raccolte meglio che un centinaio; trovasi pure nel laghetto di Gattajola (Lucchese).
2. Var. *radiata*, Moquin-Tandon (*Mytilus radiatus* Müller); vive nel lago di Bientina; rara.

2. Anodonta variabilis, Draparnaud.

Anodonta variabilis, Draparnaud (1801), Tabl. Moll., p. 108 (esclusa la var. *b*).
Anodonta piscinalis, Nilsson (1822), Moll. Suec., p. 116.

In mezzo ad un centinaio di esemplari della *A. Cygnea*, var. *Cellensis*, ho rinvenuto un individuo di questa specie identico a quelli che abbondano nel Comasco.

Genere II. — **Unio**, Philippson.

1. Unio Requienii, Michaud.

Unio Requienii, Michaud (1831), Compl., p. 106, t. XVI, f. 24.

Si trova nell'Arno a Pisa, nel Serchio presso Lucca, (Uzielli!), nel lago di Bientina; è discretamente comune.

Non è, a quanto credo, identico al tipo della specie; somiglia molto all' *U. Requienii* var. *vulgaris*, Stabile, dell'Italia settentrionale; ma se ne distingue per esser più rigonfio, meno inequilatero e meno attenuato anteriormente. Le sue valve sono solide, di colore olivastro, anteriormente e posteriormente arrotondate ed inferiormente quasi

rette. I denti cardinali sono robusti, prominenti e muniti di dentellature; la madreperla è spesse volte rosea ed azzurrognola. Dimensioni:

lunghezza . .	millimetri	50 a 55
altezza . . .	»	28 a 30
spessezza . . .	»	18 a 20

2. Unio pictorum, Linneo.

Mya pictorum, Linneo (1758), Syst. nat., ed. X, p. 671.
Unio pictorum, Philippson (1788), Nov. test. gen, p. 17.

Si trova abbondantemente in tutto il corso dell' Arno, specialmente in prossimità della sua foce; nel fosso della Madonna dell' Acqua, presso Pisa, nella Fine, nella Cecina, a Siena, a Pistoia ed in molte altre località.

L' U. pictorum di Toscana si accosta molto a quello che trovasi nei dintorni di Milano. Esso presenta le valve alquanto inequilatere, poco convesse, posteriormente arrotondate, un poco protratte e quasi troncate all' innanzi, inferiormente quasi rette. All' esterno sono di color verdastro molto chiaro, internamente sono vestite di madreperla bianca poco splendente.

I denti cardinali sono piccoli, sottili e non seghettati. Dimensioni:

lunghezza. . .	millimetri	60 a 65
altezza	»	35 a 38
spessezza . . .	»	14 a 16

3. Unio Villæ, Stabile.

Unio Villæ, Stabile (1862), in scheda.

È abbondantissimo nel lago di Bientina; abita pure il laghetto di Gattajola ove fu raccolto prima dal signor Uzielli, poi da me. Ne ricevetti alcuni individui dal Comasco dai signori fratelli A. e G. B. Villa ed altri di Viverone dal signor Carlo Mella. Gli esemplari di Toscana differiscono da quelli dell' Italia superiore per essere un poco sinuosi inferiormente.

Questa specie (almeno in Toscana) si mantiene ben distinta dalle affini. Non si può confondere coll' *U. Requienii*, Mich., per la maggior lunghezza delle valve, per essere più inequilatera, e come troncata anteriormente, e finalmente pel suo maggior volume. Dall' *U. pictorum*, Linn., si separerà facilmente per esser la sua conchiglia assai più rigonfia, più lunga, più obliqua e di color castagno scuro, anzichè verde chiaro. Per ciò che riguarda il cardine essa partecipa dei caratteri di entrambe le specie suindicate; diffatti, per la forma e la dimensione i denti cardinali, son simili a

quelli dell' *U. pictorum* e per essere minutamente seghettati si avvicinano a quell dell' *U. Requenii* (1).

Le valve sono sempre inquinate, in questa specie, di una sostanza rossiccia che ha l' apparenza della ruggine, di più offrono quasi costantemente profonde decorticazioni ed erosioni specialmente nelle parti prossime agli umboni. Internamente sono rivestite di una madreperla spesso di color bruno, raramente bianca, e poco splendente.

Genere III. — **Pisidium**, C. Pfeiffer.

1. Pisidium amnicum, Müller.

Tellina amnica, Müller (1774), Verm. hist., p. 205.
Cyclas palustris, Draparnaud (1801), Tabl. Moll., p. 106.
Cyclas obliqua, Lamarck (1818), An. sans vert., V, p. 559.

È assai comune nei ruscelli e nei fossi dell' agro pisano e lucchese, nonchè nella Val di Nievole.

2. Pisidium Cazertanum, Poli.

Cardium Cazertanum, Poli (1701), Test. Sic., I, p. 65, t. XVI, f. 1.

Questa conchiglietta è una di quelle che più variano da un luogo all'altro; nel territorio di Pisa, ove non è comune, assume una forma un poco differente dal tipo.

Genere IV. — **Sphærium**, Scopoli.

1. Sphærium corneum, Linneo.

Tellina cornea, Linneo (1758), Syst. nat., ed X, p. 678.
Sphærium corneum, Scopoli (1777), Intr. ad hist. nat., p. 398.
Cyclas cornea (partim), Lamarck (1818), An. sans vert., V, p. 558.

Abita quasi tutti i canali e ruscelli dei dintorni di Pisa, ma non è abbondante in alcuno.

2. Sphærium lacustre, Müller.

Tellina lacustris, Müller (1774), Verm. hist., II, p. 204.
Cyclas calyculata, Draparnaud (1805), Hist. Moll., p. 130, t. X, f. 14, 15.

Si trova nei canali dell'agro pisano ed è discretamante abbondante.

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(1) Il paragone s' intende soltanto istituito fra l'*U. Villæ* e gli *Unii Requienii* e *pictorum* di Toscana.

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SUNTO DEI REGOLAMENTI DELLA SOCIETÀ

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La Società si aduna in sedute *ordinarie* e *straordinarie*. Le ordinarie si tengono una volta al mese, eccettuati settembre e ottobre; le straordinarie, ogni volta che lo creda opportuno la Presidenza o il Consiglio d'Amministrazione.

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vom Verfasser.

Q. B. F. F. Q. S.

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Inest **Guilielmi Dunkeri**, philos. doctoris, P. P. O., instituti mineral. directoris, commentatio de Septiferis genere Mytilaceorum et de Dreisseniis.

MARBURGI

TYPIS BAYRHOFFERI ACADEMICIS.

Guilielmus Ruhland,

Medicinae Dr., Physiologiae P. P. O., Artis Instituti Publici Medici Director,

de Septicis Genere Mycobacterio et de Bacteriis

TYPIS BAYERIOTERRI ACADEMICIS.

De Septiferis genere Mytilaceorum et de Dreisseniis.

Antiquis temporibus denominatione Mytilorum *) vel Musculorum, germanica lingua Miessmuscheln, gallica Moules etc., varia Acephalorum vel Molluscorum bivalvium genera ex parte quidem inter se discrepantia, conjuncta sunt. Sic verbi causa clar. Argenvilleus in libro suo „Histoire des Coquillages“ in divisione „Moules“ cum Mytilo Pinnas, imo Tellinas, Arcas, Solenes et Donaces enumeravit. Eodem modo cel. Adansonius in opere eximio, cui titulus inscriptus est: Histoire naturelle du Sénégal, ad genus Pernarum (Jambonneau) Mytilos duos, Modiolam unam, Aviculam unam, imo Carditam quandam refert. Ipse Linnaeus in duodecima Systematis Naturae editione Mytilis proprie sic dictis Ostreas quasdam, ex. gr. Ostream hyotin et cristam galli ut Mytilos parasiticos unguibus affixos nec non Aviculas et Meleagrinas ut Mytilos planos seu compressos aggregavit, quibuscum insuper et Anodonta, Testaceorum genus aquarum dulcium, jungitur. Ne amplius dicam de aliorum auctorum veterum disponendi ratione.

At vero jam clar. Davila multo melius et naturae magis convenienter Mytilos ordinavit, eos in tres subdivisiones digerens, Mytilos scilicet sensu strictiore, Mytilos cylindricos i. e. Lithophagos et Mytilos triangulares, qui Pinnas complectuntur.

Multo serius Brugière Mytilos veterum auctorum reformavit eosque in limites arctiores reduxit. Deinde Lamarckius celeb. in opere: Système des animaux sans vertèbres a Mytilo omnes illas species sejunxit, quae umbonibus recedentibus, — non terminalibns, — saepius tumidis gaudent et ambitu minus trigono plerumque facile dignoscuntur. Pro hac divisione anno 1801 novum genus creavit, cui nomen Modiolae imposuit **). Quamvis igitur cum clar. Deshayesio, subtili operis Lamarckiani editore, plane consentiam Myti-

*) Vox *μυτίλος*, mytilus jam apud Plinium occurrit. Aliis auctoribus Romanis voces *mitilus*, *mitulus* vel *mutulus* eandem significationem habent.

**) Hic quidem monendum est, clar. Scopoli jam anno 1777 pro Molluscis huc pertinentibus nomen Volsellae proposuisse.

lorum verorum et Modiolarum valvas per varios transitus inter se conjunctas esse et quamvis animalia utriusque divisionis, quod attinet ad eorum naturam internam vel ut ita dicam constitutionem anatomicam, tantopere haud differant, ut pro diversis habeantur generibus, tamen haec secernendi ratio sine dubio commoda est et idonea, cum tam multarum specierum cognitionem et conspectum multo faciliorem reddat. Pari modo et plura alia Molluscorum genera jam disjuncta sunt, ut facilius conspici possint. Ceterum Lamarckius Pinnarum genus cum Mytilaceis etiamnunc commiscuit.

Tum vero Mühlfeldtius (anno 1811) Mytilaceis novum genus adjunxit, cum speciebus lapides et alia corpora marina penetrantibus eaque quasi perrodentibus nomen Lithophagorum imposuerit *).

Novissimo tempore plures Modiolarum species pro novis generibus habitae sunt, de quibus hic quidem judicium non faciam. Sunt vero haece:

Modiola sulcata Lam. (Mytilus exustus Linnaei) in Chemnitzii eximio opere vol. VIII. Tab. 84. fig. 754, ut Mytilus citrinus polydentatus optime delineata, anno 1840 a Swainsone pro typo novi generis nomine „Brachydontes“ introducta est; pariter Modiolam trapezinam Lam. eodem anno J. E. Gray ut novum genus nomine Modiolarcae promulgavit **) (cfr. Genera of recent Mollusca pag. 199). Pro formis Mytilo discordi cognatis idem auctor Lanistinam foras dedit. Denique Mytilus decussatus Mont. (Modiola cicercula Möll.) a clar. Brown Illustr. of the Conch. of Great Brit. Tab. 31. fig. 12 — 14 (Philippi Handb. d. Conch. u. Mal. pag. 363) jam anno 1827 pro typo novi generis Crenella dicti habitus est. At vero clar. Gray in libro supra citato Mytilum crenatum Chemn. vel Mytilum exustum Born (qui non est Mytilus exustus Linnaei) pro forma hujus generis typica declaravit, qui quidem ad Septiferos Recluzii pertinet, de quibus nunc uberius dicam.

Clar. Recluz hoc genus hisce fere verbis describit:

Animal marinum, byssiferum, ceterum ignotum.

Testa epidermide vestita, aequivalvis, valde inaequilateralis, latere ventris ad byssum exserendam plus minusve sinuata atque emarginata. Apices terminales subinflexi. Cardo edentulus cum septo lamelloso directo instructus. Ligamentum lineare, dorsale et anticum in fossula, a corpore cretaceo subspongioso circumdata, insidens. Impressiones musculares duae leves, antica minima rotundata in inferiore lateris interioris septi parte posita, postica magna subdorsalis, reniformis vel biloba, ligula angusta ventrali cum impressione antica conjuncta.

*) Nomen Cuverianum »Lithodomus« demum anno 1817. (Reg. anim. II. pag. 461) ortum est, quam ob rem Mühlfeldtiano jus prioritatis ut remaneat, necesse est.

**) Lapsu calami seu errore inductus clar. Beck voce »Modiolaria« pro Modiolarca usus est.

His verbis nonnullae notae maxime insignes ut adjiciantur necesse est. Valvae Septiferorum omnium, qui hucusque innotuere, striis costulisve radiantibus dichotomis vel trichotomis, saepius granuliferis margineque crenato insignes sunt; epidermis tum nuda et coriacea, tum setigera, plerumque crassa, demortuo animali valvarum marginem semper involvit, ut in omnibus Mytilis veris nec non in Volsellarum magna copia invenies. Apices denique non semper terminales sunt.

Septiferos naturae convenienter in duas subdivisiones secernere possumus: primo in eos, qui dente unico valido externo, foveolae valvae alterius respondente, gaudent setisque carent; secundo in eos, qui toto margine, ipsis apicibus non exceptis, crenis, interdum quoque denticulis nonnullis umbonum setisque instructi sunt.

Omnes Septiferorum species hucusque notae alienigenae et calidi maris incolae sunt.

Nec ullus nobis innotuit Septifer fossilis, quamquam non dubitamus, has vel illas Mytilorum species costulatas, quippe quae in variis terrae stratis occurrant, si accuratius inspiciantur, cardinis structura pro Septiferis veris mox prodituras esse.

Septiferi ad hoc tempus noti vero hi sunt:

a) Species non setigerae, dente crasso unico marginali instructae.

1. Septifer Herrmannseni Dkr.
2. „ crassus Dkr.
3. „ virgatus Tichogonia Wiegm.
4. „ furcatus Dkr.
5. „ Grayanus Dkr.

b) Species setigerae, dente marginali carentes.

6. Septifer bilocularis Mytilus L.
7. „ Kraussii Tichogonia Küster.
8. „ excisus Tichog. Wiegm.
9. „ Troschelii Dkr.
10. „ Cumingii Recluz.
11. „ Forskålii Dkr.

Descriptio specierum.

1. Septifer Herrmannseni Dkr.

„S. testa oblonga, crassa, tumida, obtuse carinata, rufa, subcuprea, latere ventris anterius albida, costulis confertis, antice distinctis et dichotomis, nonnullis trichotomis, tum vero simplicibus obsoletis instructa; epidermide crassa, atro-fusca, apices versus obliterata, marginem velante; pariete anguli cardinalis magno oblique emarginato, rubescente; cardine valvae dextrae unidentato, sinistrae foveolato; colore interno albido et coerulescente, marginem posteriorem versus subcupreo, parum nitente.“

Long. speciminum majorum 2 poll. 1 — 2 lin. *). Long. alt. et crass. ratio haec est: 100, 45, 48.

Cfr. Septifer Herrmannseni Dkr. in Zeitschr. f. Mal. 1853. pag. 85.

Omnium sui generis maxima species. Umbones in speciminibus adultis et antiquis crassi, obtusi et detriti sunt, in junioribus vero acuminati. Septum magnum oblique emarginatum irregulariter obsoleteque striatum; ejusdem formatio Crepidularum laminam in mentem vocat. Valva dextra, — vel, quod idem est, sinistra, si eam a latere basali adspicis — sub umbone dente erecto, magno et valido, saepius crenulato, instructa est, qui quidem dens foveae valvae alterius respondet. Ligamentum crassum atque fibrosum, dimidiam testae longitudinem occupans, in fossula calcis porosae immersum est. Impressio muscularis postica biloba, lobi impares, irregulares. Reliqua testae pars interior punctulis stigmosis signata est.

Septifer virgatus (Tichogonia) Wiegm. Arch. f. Nat. 1837. I. pag. 49. sine dubio est species affinis. Recluzio affirmante Mytilus trifurcatus Conr. (Journ. of the Academy nat. history science of Phil. vol. 7. 1837. 2. pag. 241. fig. 14.) huc pertinet, quem quidem cognitum non habeo.

2. Septifer crassus Dkr.

„S. testa oblique ovata, subtrigona, crassa, obtuse carinata, rufa, subpurpurascente, costulis confertissimis ad apices sculpta, epidermide obscure cornea induta; tota basi parum curvata, fere plana, margine dorsali medio fornicato, latere postico rotundato, fere compresso; septo obliquo medio parum emarginato; cardine valvae dextrae foveolato, sinistrae unidentato; colore interno rufo, passim vivide iridescente; ligamento crasso dimidiam dorsi partem occupante; margine tenerrime crenulato, ab epidermide obducto.“

*) In mensuris indicandis norma Parisina usus sum.

Long. 1 poll. 7 lin. sed plerumque minor. Long. alt. crass. = 100, 52, 48.

Patria litus Peruanum ex auctoritate mercatoris, a quo testam accepi.

Cfr. Septifer crassus Dkr. in Ztschr. f. Mal. 1853. pag. 86.

Species respectu habito sculpturae, coloris et formationis septi conchae antecedenti persimilis est, differt vero non solum forma sua, quae ambitu Mytilo eduli fere respondet, sed etiam situ dentis, qui est in valva sinistra.

3. Septifer virgatus Tichogonia Wiegm.

„S. testa oblongo-trigona, costis inferius tri-vel quadripartitis, marginem versus subevanescentibus; extra atropurpurea, intus violacea.“

Praeterea dentis cardinalis unici valvae sinistrae mentionem facit auctor, simulque laudat varietatem c Mytili bilocularis L. (Lam. an. s. vert. VII. pag. 39.) cum signo quidem interrogationis.

Cfr. Tichogonia virgata Wiegm. in Arch. f. Nat. 1837. I. pag. 49.

Long. 20, alt. 10 et crass. 9 lin. aequat.

Haec species sine dubio Septifero Herrmannseni admodum affinis vel plane eadem est. Sed descriptio clar. Wiegmanni sine ulla icone illustrante tam brevis est, ut nihil de hac concha pro certo affirmari possit.

4. Septifer furcatus Dkr.

S. testa oblongo-trigona, solidula, utrinque tumida, basi plana, antice subsinuata, intus extraque purpurascente, basin versus albida, sulcis incrementi concentricis nonnullis costisque granosis furcatis, basi subtilioribus, marginem posticum versus validioribus instructa; epidermide atra induta; septo parvo obliquo; umbonibus parvulis acutis subinclinatis.

Long. $13^1/_2$ lin. Long. alt. crass. ratio circiter haec est: 100, 58, 56.

Specimen unicum, quod vidimus Londini in collectione Cumingiana, e China originem ducit.

Species a Septifero crasso statura minore, costis majoribus granulatis, quae latus posticum versus validiores fiunt, primo obtutu distinguenda.

Quaenam sit species Dreissena purpurascens Bensoni. Chusan. Annales IX. pag. 489. „testa quadrilatera, radiatim plicata, alba et purpurascente, epidermide fusca obducta,“ certe dicere non possum. Sine dubio Septiferi quaedam species esse videtur.

5. Septifer Grayanus Dkr.

S. testa parva ovato-trigona, solidula, utrinque carinata, albida et pallide fusca vel flavescente; epidermide crassa obscure cornea vel atra, marginem subtiliter crenulatum

involvente obducta, costis lateralibus mature dichotomis paullo distantibus costulisque basalibus simplicibus confertissimis instructa; umbonibus subacutis; septo parum irregulariterque emarginato; cardine valvulae dextrae denticulo unico munito, sinistrae foveolato.

Long. 10 — 11. lin. Ratio mensurae plus minus haec est: 100, 52, 50.

Habitat, ut videtur ad insulas Moluccenses. Exstat in Museo Britannico nec non in collectione amici Joannis Bosquet Trajecti ad Mosam.

Haec conchula, in honorem cel. Gray musei Britannici directoris nominata, certe ad rariora Mollusca pertinens, forma sua et sculpturae indole facile cognoscenda est. Ambitus plus minusve trigonus; margo cardinalis fere rectilineus, dimidiam circiter testae longitudinem tenens, cum margine postico subsinuato arcum parvulum format; margo basalis rectus vel antice leviter arcuatus, in uno trium speciminum, quae examinare contigit, postice sinuatus est. Costae in utroque latere paullo distantes granosae et furcatae usque ad carinam majores sunt, sed tota area basalis costulis simplicibus confertissimis tegitur. Striae concentricae, costas decussantes, subtiles sunt; praeterea plura incrementi intervalla cum sulcis distinctis observantur. Umbones parum inclinati, subacuti, terminales. Ligamentum quidem parvum, sed profunde immersum est. Color sub epidermide atra albidus et flavescens, color internus sordide albus vel albide coerulescens, in fundo valvarum interdum subfuscus. Testa margines versus parum iridescit.

6. Septifer bilocularis Mytilus L.

S. testa subrhombea, crassa, plano-convexa, basi utrinque inflata, costulis granosis longitudinalibus confertis, passim furcatis instructa; margine cardinali subrecto; latere dorsali subsinuato, fere recto, parallelo basi planiusculae, antice sinuatae, medio excavatae, utrinque carinatae; septo lato, plerumque integerrimo.

Longitudo speciminis quod exstat maximi 28 lin. efficit. Long. alt. et lat. ratio haec est: 100, 52, 40; sed alia specimina in mensuris maxime variant.

Habitat in Oceano Indico, ad Nicobaricas et Philippinarum insulas, ad insulam Madagascar nec non in mari australi.

Mytilus bilocularis Linnaei S. N. ed. XII. pag. 1156. — Gmel. S. N. ed. XIII. pag. 3352. no. 8. — Mytilus Nicobaricus Chemn. Conch. Cab. vol. VIII. Tab. 82. fig. 736. α. β. (icon optima) fig. 737. (2 et 3) testa junior. — Myt. biloc. Speng. Cat. Tab. VI. fig. 3. 4. 5. — Enc. méth. pag. 218. fig. 5. a. b. (bene). — Lam. anim. s. vert. ed. II. pag. 39. var. a. exclusis varr. c. („testa extus intusque fusca“) et d. („testa extus ferruginea, intus albida“) et Mytilo exusto Born Mus. Tab. VII. fig. 5. = Myt. crenato Chemn. VIII. Tab. 83. fig. 744. a. b.) — Tichogonia Wiegmanni Küster. Conch. Cab. vol. VIII. pag. 10. Tab. 2. fig. 6 — 10. specimen adultum, fig. 11 — 17. (excepta fig. 13.) Tichogonia bilocularis

(testa juvenis). — Anton Verz. pag. 17. no. 636. — Septifer bilocularis Recluz Rev. zool. 1848. no. 9. pag. 278.

Concha forma sua pro aetate pervaria est. Specimina juniora semper sunt ovato-trigona, sicuti plurimi Mytili, aetate vero testa in ambitu tantopere mutatur, ut in formam rhomboidalem sensim transeat; haec est facies in Mytilaceis prorsus insolita. Valvae modice convexae, antica vero baseos parte utrinque inflatae, obtuse carinatae; fissura ad emittendam byssum pro magnitudine conchae exigua, in areola baseos valde excavata posita est. Color in postico testae latere plerumque fusco-vel atro-lividus, passim prasinus vel coeruleo-viridescens, apices versus vivide coeruleus vel albidus; praeterea concha lineolis punctulisque fuscis vel atris ornata est. Epidermis viridis, crassa, setigera; setae non solum simplices, sed etiam subramosae, in speciminibus juvenilibus integris confertae inveniuntur.

Duo exemplaria juniora Mytilorum staturam simulantia, ad collectionem Cumingianam pertinentia, ob colorem inprimis memoratu digna sunt. Alterum rufum, ad apices aeque ac baseos anticam partem album, intus rufo-coerulescens, denticulis cardinalibus utriusque valvae tribus distinctis insigne; alterum vivide prasinum, ad apices coeruleo-viride, intus glaucum. Testae nonnullae collectionis nostrae structura septi, latere plus minusve emarginati, et ratione mensurae mirum in modum variant, nihilominus tamen variis mutationibus conjunctae sunt. — Tichogonia Wiegmanni Küst. l. c. exemplar quidem minus, sed adultum, Septiferum bilocularem verum repraesentat.

7. Septifer Kraussii Tichog. Küst.

S. testa ovata vel ovato-trigona, convexa, striis subtilissimis et sulcis incrementi concentricis costulisque granosis furcatis instructa; colore viridi, ferruginea, fusca vel livida variegata; epidermide cornea, setigera vestita, setis longis, fusco-flavidis praesertim marginem inferiorem versus confertis; septo integro saepius paullulum obliquo et proxime ligamentum emarginato.

Habitat ad litus Africae australis aliisque in terris.

Tichogonia Kraussii Küster. Conch. Cab. ed. II. vol. VIII. 3. Tab. 6. fig. 1 — 6. (descriptio adhuc desideratur). — Tich. Kraussii, Krauss Südafr. Moll. pag. 26. — Myt. crenatus Chemn. vol. VIII. pag. 165. Tab. 83. fig. 744. a. b. (Mytilus exustus Bornii [nec Linnaei] Mus. Vind. pag. 125. Tab. VII. fig. 5. a. b.) ad hanc speciem pertinere videtur

Species maxime variabilis est. Nonnullae varietates tam prope ad Septiferum bilocularem accedunt, ut minime poeniteat me eorum sententiae esse, qui putant, concham, de qua hic sermo est, aeque ac Septiferum bilocularem ad unam eandemque speciem pertinere.

8. Septifer excisus Tichog. Wiegm.

„S. testa oblongo-trigona, dense striata; striis eminentibus, confertis, mature furcatis; angulo lateris antici rotundato; epidermide flavicante; lamina valvarum subapicali sinuato-excisa; denticulis cardinalibus internis sub utroque apice pluribus, minimis.“

Long. 19½ lin. alt. 10 lin. crass. 11 lin.

Tichogonia excisa Wiegm. Arch. f. Nat. 1837. I. p. 49. — Septifer fuscus Recluz Rev. Zool. 1848. no. 9. pag. 279.

Habitat in Oceano Indico (Lamare Piquot), ad litus Borneense et Madagascariense teste H. Cuming.

Species praecedente plerumque minor, forma sua maxime variabilis, modo est ovato-subtrigona, modo oblonga vel ovalis, interdum ambitum Mytili edulis aequat. Costulae confertae granulosae, bi-vel trifurcatae, marginem posticum versus accrescunt et validiores fiunt. Costularum interstitia sub vitro transversim striolata apparent. Septum in adultis speciminibus margine valde excisum et latere inferiore canaliculatum est. Ligamentum parvum ⅔ fere marginis cardinalis tenet; totus conchae margo crenis perspicuis circumdatur, ita ut particula supra septum, denticulis quinis vel septenis serie ordinatis instructa, Nucularum cardinem simulet. Color testae albidus saepe fuscescens; epidermis cerina. In speciminibus antiquis testa solida et crassa nascitur et impressiones musculares callosae fiunt.

9. Septifer Troschelii Dkr.

„S. testa oblonga, solidula, tumida, obtuse carinata, albida, epidermide nitida, flavida, passim setigera vestita; costulis confertis granulosis dichotomis et trichotomis marginem posteriorem versus incrassatis, ad basin subtilioribus, eleganter sculpta; septo anguli cardinalis utrinque inciso, in medio regulariter emarginato; ligamento pro statura testae parvo et valde brevi; umbonibus parvulis, subacutis, paullo incurvis; margine toto intus subtiliter crenulato, submargaritaceo, colore interno albo, latus posticum versus sublivido.“

Long. fere 11 lin. Long. alt. crass. = 100, 44, 42.

Patria ignota.

Cfr. Septifer Troschelii Dkr. in Zeitschr. f. Mal. 1853. pag. 87.

Species forma elongata, angusta, margine basali subrecto valvulisque convexis, utrinque subcarinatis insignis est. Valvulae sulcis incrementi concentricis saepius bi- vel tripartitae sunt.

Haec species fortasse in posterum cum Septifero exciso jungenda est.

10. Septifer Cumingii Recluz.

S. testa parvula, solidula, ovato-trigona, utrinque inflata, subcarinata, virescente vel prasina, unicolore, interdum albo lividoque radiata et maculata, basi pallidiore vel

albida, epidermide setigera, cornea, translucente obducta; costulis subtilibus dichotomis, marginem dorsalem et posticum versus accrescentibus striisque concentricis, costulas decussantibus, eleganter sculpta, paene granosa; umbonibus tumidis involutis; septo parvo paullulum emarginato.

Long. 6 lin. Long., alt. et lat. ratio fere haec est 100, 52, 50.

Habitat ad fretum Panamense. Specimina examinata Londini exstant in collectione clar. H. Cuming.

Species parvula, singularis, utrinque inflata et subcarinata, umbonibus suis tumidis involutis totoque habitu, praesertim dorso postice fornicato, Volsellarum formam repraesentat. Area basalis paene plana, utrinque declivis, eo in loco, quem fissura exigua ad byssum projiciendam tenet, paullulum sinuata est. Cardo denticulis foveolisque nonnullis, se invicem recipientibus, munitus est. Totus conchulae margo perspicue crenulatus, ab epidermide involvitur. Facies interna colore coeruleo viridescente signata est; sed cum testa pellucens sit, pictura quoque externa perspici potest. Exemplar collectionis nostrae pullum setis corneis gaudet.

11. Septifer Forskålii Dkr.

S. testa parvula ovato-oblonga, subtrigona, inflata, colore fusco-livido et viridescente variegata; epidermide cornea (setigera) obducta, area baseos albida, paene cordiformi, costulis confertis, subgranosis, mature dichotomis ornata; umbonibus tumidis inclinatis, carnia obtusa, sed distincta, ad latus posticum utrinque decurrente; fissura ad byssum emittendam obliqua; septo haud emarginato, oblique truncato, paullum immerso; margine conchulae toto crenato, ad apices paene denticulato; colore interno latus posticum versus coeruleo, margaritaceo, pulcherrimo.

Long. $5^1/_2$ lin. Long. alt. lat. = 100, 55, 68.

Habitat mare rubrum.

Specimen unicum, quod in Museo Universitatis Hafniae exstat, quodque videndi a clar. Jap. Steenstrup Professore data est occasio, celeberrimus Petrus Forskål in itinere Africano quondam legit. Respectu habito formae atque magnitudinis antecedenti speciei simile est, sed formatione septi statim differt, ne dicam de aliis differentiis. — Epidermis quidem obliterata est et magnam partem dehivit, nihilominus tamen non dubito et hanc nostram speciem aetate juvenili atque statu integro setis obductam esse.

De Dreisseniis.

Sectione Mytili Chemnitzii Fér. a clar. van Beneden instituta ejusdemque historia naturali uberius exposita (conferantur Annales des Sciences naturelles T. III. Avril 1835.) satis apparuit, animalculum illud a Mytilis veris valde differre, quapropter ille rerum naturae investigator assiduus Mytilum Chemnitzii pro novo genere declaravit, cui Dreissenae nomen tribuit, in honorem viri ornatissimi Dreissen, qui hoc molluscum primus in Belgio detexit. Eodem anno etiam Rossmässlerus novum genus Tichogoniae (a voce τεῖχος paries et γωνία angulus) creavit, cardinis formatione nixus, cum testa in angulo cardinali pariete parvulo vel lamina munita sit. Nec minus clar. Partsch in speciebus quibusdam telluris tertiariae fossilibus tales differentias in cardinis structura detexit, quales in vivo Mytilo Chemnitzii reperiuntur; species illas huc pertinentes Congerias nominavit. Clar. Cantraine denique nomen Mytilinae vel Mytulinae et postea Mytilomyae adjunxit. At disquisitione clarissimi de Baer jam antea edocti sumus, incolam testae, de quo hic est sermo, natura vel constitutione sua ab aliis Mytilaceis bene secernendum esse.

Quamvis omnium harum denominationum genericarum nomen Rossmässlerianum aptissimum videatur, quippe quod cardinis structuram optime indicet, nihilominus tamen nomen Dreissenae (vel potius Dreisseniae monente Bronn) jus prioris aetatis habet.

Quem locum in systemate Molluscorum bivalvium teneat Dreissenia, magna est dissensio inter viros doctos. Nam clar. van Beneden eam Chamaceis adnumerat, Cantraine vero Myaceis, Philippi, Bronn aliique scriptores conchas huc pertinentes Mytilaceis adjungunt, quam disponendi rationem et egomet ipse antea secutus sum. Teste clar. A. Müllero (Arch. f. Nat. 1837. pag. 40.) nervorum natura fere eadem atque in Anodontis est, ceterum animal Mytilo respondet, sed pallio ejus fere toto clauso, foraminibus tribus angustis instructo — uno ad byssum emittendam, altero ad respirationem et tertio ad alvi dejectionem — satis differt (cfr. Philippi Handb. d. Conch. u. Mal. pag. 364.), quam ob rem naturae convenienter Dreisseniae pro familia distincta a Mytilaceis ut secernantur aptum nobis videtur. Pari modo jam doctissimus Gray Dreissenias nomine Dreissenidarum a Mytilaceis disjunxit, simul Mytilimeriam Conr. et Myoconcham d'Orb. — hanc quidem cum signo interrogationis — huc referens. Species fossiles, Congeriae scilicet, pro genere separato habentur, quamvis testae structura nihilo differant a Dreisseniis vivis. Fortasse et genus Byssanodontae d'Orb. (Voy. dans Amér. merid. pag. 622.) ad Dreisseniacea referendum est, quod clar. d'Orbigny Unionaceis adnumerat.

Dreisseniarum testa ab omnibus Mytilaceis primo obtutu valvulis plus minusve inaequalibus distinguitur; nam valva dextra plerumque convexior est sinistra, quam ita recipit, ut ejus margo paullulum prosiliat, — tali fere valvarum formatione, qualis in Gervilleis

observatur. Praeterea apex valvulae dextrae saepius aliquantulum prominet, ut maxime in speciebus nonnullis fossilibus apparet, verbi causa in Dreissenia amygdaloide. Ceterum Dreisseniae forma sua Mytilis respondent, speciebus fossilibus quibusdam exceptis, quae habitum valde alienum et peculiarem prae se ferunt sicuti Dreissenia subglobosa.

Interna generis structura admodum singularis est; angulus valvarum anticus vel umbonalis septo seu pariete transverso in utraque valvula instructus est, musculum clausorium minorem recipiens. . Impressio muscularis postica major, ut in Mytilo et Septifero, se offert; pari modo valvulae medio margine inferiore hiant ad byssum exerendam. Dreisseniae nunquam costulatae inveniuntur, ut Septiferorum genus, eorumque epidermis tenuis saepius lamellosa, nunquam setigera est. Sub apice valvulae dextrae pars parvula prominens haud raro invenitur, foveolae alterius valvulae respondens. Dreisseniarum multarum septum cum lamina parva interdum cochleata conjunctum est. Haec lamina, plus minusve perspicua, in speciebus nonnullis fossilibus valde incrassata et callosa, semper superiori parietis parti affixa est, simulque regulae dorsalis particulam occupat.

Superficies testae internae parum nitet vel opaca est exceptis impressionibus muscularibus et linea palliari, quae nitore languido agnoscuntur, sed splendorem margaritaceum nec in ulla Dreisseniarum specie invenies. — Dreisseniae in duas divisiones secerni possunt: primo in eas, quibus est septum simplex, secundo in eas, quae septo, lamina parvula, saepius cochleata affixa, instructae sunt.

Dreisseniae fossiles, ex parte eximiae magnitudinis, magni momenti sunt pro definiendis formationibus quibusdam telluris tertiariae; praesertim iis in stratis frequentissime occurrunt, quae ex aquis mixtis, dulcibus scilicet atque salsis orta sunt, quapropter tantum cum Molluscis marinis rarissime obveniunt. Eodem modo et species plures in aqua dulci vel semisalsa hodie vivunt late dispersae variis regionibus et calidis et temperatis. — Mytilus membranaceus Dkr. Mon. d. nordd. Wealdenb. pag. 25. Tab. XI. Fig. 10 et 11 a. b. omnium specierum ad hoc usque tempus notarum fortasse est antiquissima Dreissenia, quod tamen pro certo non affirmaverim, cum mihi nondum contigerit, ut structuram testae internam examinarem.

Conspectus specierum hic est:

a) Species septo simplici instructae.

vivae:

1. Dreissenia Chemnitzii Mytilus Fér.
2. „ Cumingiana Recluz.
3. „ carinata Dkr.

fossiles:

4. „ acutirostris Mytilus Goldf.

5. Dreissenia spatulata Congeria Partsch.
6. „ gracilis Mytilus Rousseau.
7. „ ungula caprae Mytilus Münst.
8. „ aperta Mytilus Desh.

b) Species cum lamina parvula, septo affixa.

vivae:

9. Dreissenia Küsteri Dkr.
10. „ Rossmässleri Dkr.
11. „ cochleata Mytilus Kickx.
12. „ Pfeifferi Dkr.
13. „ Gundlachii Dkr.
14. „ Sallei Recluz.
15. „ Mörchiana Dkr.
16. „ Africana van Ben.
17. „ Riisei Dkr.
18. „ Americana Recluz.
19. „ Domingensis Recluz.

fossiles:

20. „ clavaeformis Krauss.
21. „ amygdaloides Dkr.
22. „ Brardii Mytilus Brongn.
23. „ Basteroti Mytilus Desh.
24. „ subcarinata Mytilus Desh.
25. „ Balatonica Congeria Partsch.
26. „ triangularis Congeria Partsch.
27. „ Partschii Congeria Czjzek.
28. „ subglobosa Congeria Partsch.

Descriptio specierum.

1. Dreissenia Chemnitzii Mytilus Fér.

D. testa convexa, ovato-trigona, carinata, concentrice striata, sub epidermide virescente vel atro-cornea albida, zonis lineisve fulmineis fuscescentibus varie picta; area basali lata, plana, cordiformi, plerumque unicolore, in medio saepe concava, fissura ad byssum vel barbam emittendam obliqua; umbonibus parum incurvis; facie interna coeruleo-alba, parum nitente vel opaca; septo regulariter sinuato, lineis obsoletis, margini parallelis, signato.

Long. speciminum majorum usque ad 20 — 22 lin. Long. alt. et lat. ratio variat, plerumque numeris 100, 45, 50 respondet, sed occurrunt specimina multo latiora, in quibus est ratio dimensionis haec: 100, 50, 64.

Synon. Mytilus e fluvio Wolga testa laevi, subtriangulari, transversim ex albo et spadiceo fasciata Chemn. Conch. Cab. vol. XI. pag. 256. Tab. 205. fig. 2028. — M. polymorphus Pall. vol. I. app. 85. — M. polym. Schröt. Einl. vol. III. pag. 471. — M. polym. Gmel. S. N. pag. 3363. — M. Chemnitzii Fér. Bull des sc. nat. N. 5. 1826. 140. n. 114. — M. Hagenii Baer Descr. pag. 17. 1825. — M. Volgensis Gray Ann. of. Phil. New. Ser. vol. IX. pag. 139. 1825. — M. lineatus Waardenb. (nec. lineatus Gmel.) — M. Arca Kickx Descr. d'une nouv. esp. de Moule. — Tichogonia Chemnitzii Rossm. Icon. 1835. I. pag. 113. fig. 69. — Wiegm. Arch. f. Nat. 1837. I. pag. 50. — Küster in Mart.-Chemn. Conch. Cab. ed. II. vol. VIII. 3. pag. 6. Tab. I. fig. 3. 4. 5. *) — Dreissena polymorpha van Ben. Ann. d. sc. nat. 1835. 3. pag. 210. — Bull. de l'acad. de Brux. II. pag. 44. — Mytilus polym. Desh. in Lam. hist. des an. sans vert. vol. VII. pag. 50. — Mytilina polymorpha Cantr. etc.

De sectione conchae ejusque bysso praeclaras observationes fecit clar. A. Müller in Wiegm. Arch. vol. III.

Haec concha insignis, de qua clar. van Beneden et Rossmässler primi uberius tractaverunt, in fluminibus quibusdam majoribus habitat, praesertim iis in locis, ubi aqua leniter fluit; inveni eam ex. gr. in Albi prope Hamburgum ligno, Anodontis et Paludinis insidentem, in flumine Havel ad vicum Werder haud procul a Postampio, aliis Molluscis bysso affixam et copiosissime conglomeratam, in Viadro prope Stettinum, in aquis prope Gryphis-

*) Sed quaeritur, num fig. 4. ad hanc nostram speciem, an potius ad aliam pertineat. Nam appendicula juxta septum posita pone ligamentum, quae in constituendis variis speciebus magni momenti est, cujusque mentionem fecit Küsterus, in nullo specimine Dreisseniae Chemnitzii observavi. Exemplaria quoque Russica ac Polonica appendicula illa prorsus carent, quam ob causam persuasum mihi est, specimen, quod Fig. 4. effert, non ad Dreisseniam Chemnitzii veram pertinere, sed ad aliam speciem, quam Dreisseniam Küsteri nominaverim.

waldam aliisque locis. Clar. H. Cuming specimina e Thamesi prope Londinum dono mihi dedit et Fried. de Hagenow concham, in aqua Viadri semisalsa, ubi mare Balticum attingit, captam, mecum benigne communicavit. Omnia haec specimina in remotissimis regionibus collecta, quorum plurima exstant, eandem formam, structuram et picturam prae se ferunt, ita ut denominatio Mytili polymorphi minime apta esse videatur, si tantummodo specimina fluviorum respiciuntur. Sed celeb. Pallasius, Mytilum suum polymorphum describens, duas formas diversas ante oculos habuit. Dicit enim concham et in mari Caspio et in aquis dulcibus Russiae vivere. Describit eam hisce verbis: *Marinus* (sc. Mytilus) nuclei pruni magnitudine. — Valvulae, praesertim nates magis carinatae, latere incumbente planiusculae atque sine colore, in superiore vero parte circulis griseo-fuscis undulisve variae. Nates acutissimae, subdeflexae. *Fluviatilis* saepe quadruplo major, subfuscus, valvulis exacte semiovatis, argute carinatis, latere incumbente plano excavatis, natibus acutis deorsum inflexis, loculorum dissepimentis brevissimis, glomeratim penicillis radiatis, lapidibus et testaceis adhaerens, ut Mytilus edulis.

Illa descriptio „marini Mytili“ bene quadrat cum speciminibus in fundo Maris Caspii alti nec non ad peninsulam Abscheron prope urbem Baku cum Cardiis illis mirandis Adacna scilicet vitrea et plicata aliisque lectis, quae amicus clar. Dr. Auerbach ante complures annos e Moscovia misit. Testa enim minore, multo solidiore, magis carinata, margine cardinali longiore, basi valde sinuata, apicibus rostriformibus et pictura aliena bene distinguuntur, ita ut alia species esse videatur. An potius credendum est, concham Wolgae usque ad litus, ubi in mare Caspium influit, sensim forma sua et natura tantopere mutatam esse? Haec est opinio mea, praesertim cum aquae natura mutata et Molluscorum forma mutari possit.

Sane res est commemoratu digna, quod variis locis magna copia nunc conspicitur harum concharum, ubi antea nulla visa erat. Piscator quidam, aetate jam confectus, in oppido Werder ad Postampium natus, anno 1834, cum hanc regionem viserem, mihi affirmavit, se animalcula illa, quae rei piscariae obstarent — qua de causa comperire non potui — dum juvenis fuisset, nunquam vidisse. — (Conferantur ea, quae clar. Wiegmann de lata et subita hujus conchae diffusione per magnam Europae partem jam dixit in Arch. f. Natg. vol. IV. 1. pag. 342. pariter et ea, quae de hac re a clar. Bronnio in editione germanica operis conchyliologici a Georgio Johnstone pag. 482. allata sunt.

2. Dreissenia Cumingiana Dkr.

D. testa ovata, convexa, carinata, concentrice striata et rugosa, alba, colore atropurpureo variegata; epidermide virescente lamellosa; basi in medio subsinuata; umbonibus paene rectis; septo simplici.

Long. 17. lin. Long. alt. lat. = 100, 50, 52.

Exemplum unicum, e flumine Missisippi Amer. bor. allatum, quod in collectione Molluscorum eximia clar. H. Cuming Londini vidimus; primo obtutu speciminibus nostris Dreisseniae Chemnitzii adultis et obsoletis plane respondere videtur; sed accurata disquisitio docet, illud praesertim his duabus notis secernendum esse: primum area basali minus plana, non cordiformi, deinde dorso aequaliter curvato, i. e. linea cardinali cum margine conchae posteriore angulum obtusum non formante. Facies interna, color et epidermidis structura omnino conveniunt cum Dreissenia Chemnitzii.

3. Dreissenia carinata Dkr.

D. testa ovato-oblonga, subtrigona, interdum paene trapezoidea vel aequivalvi, parvula, solidula, intus extraque albida, subpellucente, concentrice et acute striata, plerumque nuda, epidermide tenui, pallide cornea, rarius obducta; dorso fornicato; basi plana, antice subsinuata, carina valde distincta, ab umbonibus acutis subincurvis ad latus posticum decurrente; lamina parvula, ut solet, in medio emarginata; fissura byssi angustissima.

Long. speciminis majoris fere 6 lin. Long. alt. lat. 100, 48, 46.

Patria ignota.

Cfr. Tichog. carinata Dkr. in Zeitschr. für Mal. 1853. pag. 90.

Concha parvula carinis, ab umbonibus acutis ad latus posticum decurrentibus, margine cardinali recto brevissimo, ligamentum parvulum paene occultante, valvulisque paene aequalibus ab omnibus Dreisseniis, ad hoc usque tempus notis, bene distinguenda est. Valvulae acute striatae, sub vitro interdum rugulosae, unicolores, albae apparent, si eas expurgaveris.

4. Dreissenia acutirostris Mytilus Goldf.

„D. testa ovato-acuta, laevi (vel concentrice striata); umbonibus acutis, subrectis, latere inferiore abrupte declivi.“

Goldf. Petr. Germ. vol. II. pag. 172. Tab. CXXIX. fig. 11. a. b.

Species ex icone tantum citata mihi nota, habitu certe Dreisseniae Chemnitzii et claviformi simillima est. Cum vero in icone Goldfussiana septum parvum simplex conspiciatur, eam melius Dreisseniae Chemnitzii adjungendam esse opinor.

Goldfussio affirmante in stratis formationis tertiariae mediis regionis Viennensis et Galliae meridionalis occurrit.

5. Dreissenia spatulata Congeria Partsch.

„D. testa ovate acuminata, convexa, umbonibus subcernuis, margine cardinali recto, latere inferiore convexo declivi, margine hiante.“

Congeria spathulata Partsch Ann. d. Wien. Mus. I. pag. 100. Tab. 12. fig. 13 — 16.

Mytilus spathulatus Goldf. Petr. II. pag. 172. Tab. CXXIX. fig. 12. (num vera est Congeria spathulata?)

Occurrit in formatione Viennensi tertiaria. Speciminibus genuinis caret collectio.

6. Dreissenia gracilis Mytilus Rousseau.

D. testa crassa, convexa, ovate acuta, subobliqua, lamellis rugisque concentricis instructa; dorso paene aequaliter curvato, margine basali subrecto; umbonibus acutis paullum declivibus ideoque paene rostriformibus; septo crasso concavo; linea palliari valde impressa.

Specimen unicum, quod exstat, 19 lin. longum est ejusque long. alt. et lat. ratio his circiter numeris respondet: 100, 54, 50.

Mytilus gracilis Rousseau nititur auctoritate clar. von dem Busch Bremensis, a quo testam accepi. Sane doleo, quod descriptionem comparare haud potui.

Una cum Dreissenia subcarinata Desh. ad Kertsch Russiae occurrit. Valvulis crassis, fornicatis, non carinatis insignis est.

7. Dreissenia ungula caprae Myt. Münst.

D. testa trigona, acuta, crassa, utrinque valde carinata, concentrice striata; margine cardinali subrecto cum margine posteriore dorsali angulum obtusum formante; latere basali plano-concavo, ambitu ovali paene cordiformi.

Congeria triangularis Partsch Wien. Ann. I. 99. Tab. 12. fig. 1 — 4. (pars.) — Mytilus ungula caprae Münst. in Goldf. Petr. Germ. II. pag. 172. Tab. CXXX. fig. 1.

Clar. Bronnius in Indice suo eximio palaeontologico pag. 439. Mytilum acutirostrem Goldf. vol. II. Tab. CXXIX. fig. 11. cum signo interrogationis ut specimen juvenile ad hanc speciem refert.

In formatione telluris tertiariae ad Viennam occurrit.

8. Dreissenia aperta Myt. Desh.

D. testa elongata, ovali, solida, subinaequivalvi, concentrice rugose-striata; umbonibus obtusis, parum prominentibus, haud terminalibus; septo crasso angusto.

Specimen, quod exstat unicum, 23 lin. longum est. Long. alt. et lat. ratio numeris respondet 100, 45, 36.

Mytilus apertus Desh. Crim. pag. 61. Tab. 4. fig. 6 — 11. — ?Dreissenia aperta Bronn. Ind. pal. pag. 437.

Species singularis forma umbonibusque suis paullo recedentibus Volsellas quasdam in mentem vocans. Testa elongata, antice parum attenuata, postice dilatata; margo dorsalis et basalis parum aequaliterque arcuati; singulae valvae paene naviformes. Impressiones musculares fortes, linea palliaris profunda, latus basale anticum versus canaliculata. Septum et spatium, a linea palliari inclusum, tuberculis granulisque adspersa sunt. Fossula ad recipiendum ligamentum $^2/_3$ totius longitudinis testae occupat.

Haec species, quam clar. von dem Busch Dri Bremensi debeo, e formatione Russiae tertiaria originem ducit simulque cum Mytilo gracili occurrit. Descriptionem hujus speciei, quam clar. Deshayes publici juris fecit, inspicere mihi non contigit.

9. Dreissenia Küsteri Dkr.

(cfr. nota pag. 13.)

10. Dreissenia Rossmässleri Dkr.

D. testa ovate trigona, solida, paullulum convexa, paene aequivalvi, unicolore albida, concentrice striata, epidermide cornea lamellosa obducta; apicibus acutis rostriformibus; basi arcuata, rima ad byssum emittendam longa, angusta; septo parvulo.

Long. ad 8 lin. Long. alt. lat. = 100, 58, 48. — Patria teste mercatore Hamburgensi, a quo specimina nonnulla accepi, est Brasilia.

Tichogonia Rossmässleri Dkr. in Zeitschr. für Mal. 1853. pag. 89.

Valvulae satis solidae, fere aequales, sordide albae, ovate trigonae, in dorso margineque postico constanter fornicatae, in latere ventrali sinuatae. Apices subinclinati, paene rostriformes. Epidermis cornea tenuis, membranacea, textis araneis partim haud dissimilis. Septa parvula parum immersa.

Species nostra, Dreisseniae Salléi Recl. affinis, forma magis trigona, testa solidiore et colore albo, haud variegato inprimis distinguitur.

11. Dreissenia cochleata Mytilus Kickx.

D. testa elongato-ovata, angusta, convexa, tenui, laevigata, albida, colore fusco-cineraceo variegata, epidermide cornea tenuissima, paene araneosa induta; margine basali plus minusve recto, dorso parum fornicato, linea cardinali dimidiam fere longitudinem testae occupante; umbonibus parvulis subacutis; septo exiguo, cum appendicula seu lamina cochleata instructo.

Long. speciminum adultorum 10 lin.; ratio dimensionum circiter haec est: 100, 50, 40.

Mytilus cochleatus Kickx. — Dreissena cochleata Nyst Coq. Belg. pag. 264. — Mytilina cochleata Contraine in Ann. nat. 1837. vol. VII. pag. 302.

Frequentissima invenitur haec species in aqua mixta vel semisalsa portus Antverpiae, ligno putrescenti, lapidibus, balanis aliisve corporibus affixa; antea vero eo loco non observata est, qua de causa conjectare possumus eam immigrasse.

Sunt qui Dreisseniam Africanam van Beneden pro varietate tantum hujus conchae habeant. At me judice non solum forma, sed etiam epidermidis indole, „cristis scilicet duabus longitudinalibus“ valde differt a Dreissenia cochleata. Ex altera vero parte haec conchula cum speciebus quibusdam telluris tertiariae fossilibus, ex. gr. cum Mytilo Brardii Brongn. confusa est, qui forma breviore et testa solidiore distingui potest.

12. Dreissenia Pfeifferi Dkr.

D. testa ovato-subrhombea, tumida, inaequivalvi, interdum subtortuosa, alba, zonis irregularibus cineraceo-fuscescentibus picta, concentrice striata, epidermide tenui, lamel-

losa, olivacea vestita; valva dextra ad marginem prosiliente; apicibus inclinatis, extrorsum parum incurvis, subacutis; septo parvulo haud profundo; fossula ad ligamentum recipiendum longa, dimidiam fere valvarum longitudinem aequante; basi valde ventrosa; rima bysso destinata parva et angusta.

Long. 10 — 12 lin. Long. alt. crass. 100, 56, 45.

Habitat in aqua semisalsa? insulae Cubanae, unde clar. Ludovicus Pfeiffer specimina plura maximam quidem partem detrita et obliterata attulit mecumque benigne communicavit.

Cfr. Zeitschr. f. Mal. 1853. pag. 88.

Species basi valde curvata et ventrosa, forma sua subrhombea maxime insignis est. Valvae striis incrementi perspicuis instructae, epidermide lamellosa obtectae sunt. Color fere ut in Dreissenia cochleata.

13. Dreissenia Gundlachii Dkr.

D. testa tenui, subtrigona, parum inaequivalvi, albida, colore griseo-fusco variegata, tenuissime striata, epidermide cornea, perparum lamellosa, paene laevi induta, latere ventrali paene recto; margine cardinali dimidiam fere testae longitudinem aequante; umbonibus parvis incurvis; septo parvulo, cum lamina magna emarginata conjuncto.

Long. 10 lin. Long. alt. crass. 100, 50, 35.

Habitat in insula Cuba, unde eam misit clar. Henr. Gundlach Dr.

Species nostra a Dreissenia Sallei maxime valvulis tenuissime striatis, paene glabratis et epidermide parum lamellosa distinguitur.

14. Dreissenia Sallei Recluz.

D. testa ovate trigona, paullulum convexa, in dorso compressa obtuseque angulata, concentrice striato-rugosa, obtuse carinata, alba, in latere dorsali colore nigrescente vel cano variegata; epidermide cornea, lamellis confertis instructa; septo cum lamina parvula conjuncto; umbonibus acutis, paullulum curvatis et inclinatis. (Secundum specimen a clar. H. Cuming acceptum.)

Long. 11 lin. Long., alt. et lat. ratio fere haec est: 100, 58, 42.

Dreissena Sallei Recluz Revue Zool. 1849. et Journ. de Conch. 1852. pag. 255 Tab. X. fig. 9.

Habitat in flumine Rio dulce reipublicae Guatimalae. Ornat. Sallé teste haec species ad conchas lithophagas seu perforantes pertinet.

15. Dreissenia Mörchiana Dkr.

D. testa paullulum convexa, ovate oblonga, interdum subtrigona et valde inaequivalvi, concentrice striata, albida, zonis nigricantibus inaequalibus variegata, epidermide olivarii,

coloris rugoso-lamellosa, interdum paene araneosa induta; umbonibus acutis, subarcuatis, saepius decorticatis.

Long. spec. maj. 11 lin. Long., alt., lat. 100, 55, 42.

Habitat ad insulam St. Thomas teste clar. Mörch, a quo concham accepimus. Dreisseniis Gundlachii et Sallei proxime cognata est.

16. Dreissenia Africana van Ben.

D. testa ovate-oblonga, irregulari plus minus inaequivalvi, tenui, concentrice striata, albida, colore fusco et griseo variegata, epidermide rugoso-lamellosa vestita, statu integro, maxime in speciebus junioribus, squamularum erectarum serie duplici insigni; apicibus incurvis, saepe decorticatis; septo parvo cum lamina exigua conjuncto.

Long. 8 — 9 lin. Long., alt., lat. 100, 60, 42.

Patria: Africa occidentalis. Senegal. Gabon.

Dreissena Africana van Beneden Ann. des scienc. nat. 1835. III. pag. 211. Tab. 8. fig. 12. 13. — Bull. de l'acad. de Brux. II. pag. 167. — Wiegm. Arch. 1837. pag. 51.

Exempla, quae amico H. Cuming debemus, in flumine Senegallio reperta sunt. Non dubitamus quin ad Dreisseniam veram Africanam pertineant. Dreissenia coerulescens van Ben., quam examinare hucusque non contigit, Recluzio affirmante (Rev. et Mag. de Zool. 1849. no. 2. pag. 70.) nil nisi varietas Dreisseniae Africanae est.

17. Dreissenia Riisei Dkr.

D. testa parvula, tenui, ovate oblonga, parum inaequivalvi, coeruleo-albida, maculis striisque nigrescentibus variegata, tenuissime striata; epidermide pallide cornea obducta; septo postice cum lamina perspicua sed truncata conjuncto.

Long. speciminum majorum vix 5 lin. Long., alt., lat. 100, 52, 42.

Habitat ad insulam St. Thomas, unde eam misit ornat. Riise.

Cfr. Mal. 1853. pag. 91.

Conchula, pullis quibusdam Dreisseniae cochleatae simillima, latere ventrali sinuato et epidermidis formatione, quae squamularum serie duplici notata est, discrepat. Squamulae ejusmodi naturae in Dreissenia quoque Africana inveniuntur.

18. Dreissenia Americana Recl.

Specimina hujus speciei parvulae, quae in collectione Cumingiana Londini exstant, Dreisseniae Riisei simillima, inprimis epidermidis serie, squamularum duplici carente, differre videntur.

Patria peninsula Florida.

Descriptio desideratur.

19. Dreissenia Domingensis Recl.

D. testa angusta, oblonga, irregulari, concentrice striata, albo et fusco variegata, epidermide cornea vestita; dorso parum fornicato; margine ventrali recto, antice sinuato et gibboso; apicibus rostriformibus; colore interno coeruleo nigrescente; septo parvulo. (Secundum exempla nostrae collectionis).

Long. 11 — 12 lin. Long., alt., lat. 100, 42, 35.

Dreissena Domingensis Recluz Journ. de Conch. 1852. pag. 255. Tab. X. fig. 8.

Habitat satis frequens in vicinia urbis St. Domingo, unde ab ornat. Sallé apportata est.

Magna est affinitas inter hanc speciem et Dreisseniam cochleatam.

20. Dreissenia clavaeformis Krauss *).

D. testa convexa, ovate trigona, obtuse carinata, basi antice parum sinuata, dorso obtuse angulato, rarius aequaliter curvato; umbonibus acutis paullo incurvis; septo cum lamina parvula oblique truncata conjuncto.

Long. speciminum adult. 11 — 12 lin. Ratio dimensionum maxime varia, plerumque ut in Dreissenia Chemnitzii.

Cfr. Krauss Moll. der Tert. Form. von Kirchberg an der Iller in Würt. Jahrb. 1852. VIII. pag. 146. — Bronn Leth. geogn. ed. III. pag. 365. — Mytilus Brardii Ziet. Verst. Würt. pag. 78. Tab. 59. fig. 1. (icon mediocris).

Specimina, quae ornatiss. Aug. Wetzler misit, ex parte bene respondent iconi Goldfussianae vol. II. Tab. CXXIX. fig. 12, pag. 172 sub nomine Mytili (Congeriae) spathulati (Partsch Ann. d. Wien. Mus. I. pag. 100. Tab. 12. fig. 13 — 16) descriptae, quapropter ea in Palaeontographicorum vol. I. pag. 193. Tab. XXI. fig. 6. 7. pro varietate hujus speciei habui. Rectius vero cum Dreissenia clavaeformi Kraussii junguntur, quod loco citato primum monuit auctor. Icon Goldfussiana specimen tantum juvenile Congeriae spathulatae exhibet.

Nonnulla specimina Dreisseniae clavaeformis picturam undulatam coloris primarii et genuini cinereo-fusci ostendunt, Dreisseniae Chemnitzii plane respondentem, cui omnino simillima est. Attamen differt inprimis carina obtusa et lamina parvula septo affixa, cujus nullam mentionem facit clar. Krauss, quamvis bene delineata sit in ipsius icone supra citata.

Concha una cum Dreissenia amygdaloide et Cardio sociali in arena grisea telluris tertiariae saepius occurrit ad Günzburg Bavariae nec non ad Unterkirchberg in regno Wurtembergensi.

21. Dreissenia amygdaloides Dkr.

D. testa ovata, forma paene amygdali, valde inaequivalvi, valvulis crassis, convexis, concentrice striatis, umbonibus obtusis, parum incurvis; margine cardinali arcuato; basi

*) Melius claviformis.

subrecta vel paullulum arcuata, septo in angulo umbonali utriusque valvae parvo sed solido, cum lamina parvula cochleata conjuncto.

Long. specim. maximorum ad 7 lin. Long., alt. et lat. ratio numeris respondet 100, 52, 50.

Congeria amygdaloides Dkr. in Pal. vol. I. pag. 162. Tab. XXI. fig. 8. 9. — Dreissena amygd. Krauss in Würt. Jahresh. 1852. VIII. pag. 145. — D. amygd. Bronn Leth. geogn. pag. 364.

In formatione telluris tertiaria, „Süsswasser-Molasse" dicta, prope Günzburg et Unterkirchberg ad Ulmam in regno Wurtembergico una cum Paludinis, Melaniis, Neritinis aliisque Molluscis satis frequens invenitur.

Species nostra, forma sua plus minusve amygdaloide insignis, Dreisseniae Brardii proxime cognata est, a qua tamen differt testa solidiore, antice obtusiore, valvulis in basi magis declivibus et umbonibus obtusis, incurvis. Specimen exstat pictura vere undulata et colore primario notatum.

22. Dreissenia Brardii Myt. Brongn.

D. testa parva ovate oblonga, concentrice striata, valvulis valde convexis, dorso subangulatis, ad basin parum curvatam declivibus; umbonibus arcuatis, inclinatis; septo parvo cum lamina exigua paene cochleata conjuncto.

Long. plerumque 5 — 6 Lin. Ratio dimensionum fere ut in Dreissenia amygdaloide.

Mytilus Brardii Brongn. terr. calc. trapp. pag. 36. 37. 38. 78. Tab. VI. fig. 14. — Goldfuss Petr. vol. II. pag. 171. Tab. CXXIX. fig. 10. (icon optima!) — Dreissenia Brardii Bronn. Leth. geogn. ed. III. pag. 363. Tab. XXX. fig. 10. Conferantur ibid. cetera synonyma. Tichogonia clavata Krauss — lapsu calami, ut opinor, pro clavaeformis Krauss — huc non pertinet, neque Mytilus cochleatus Kickx (Dreissena cochleata Nyst Coq. des terr. tert. de la Belgique pag. 264.) neque Dreiss. Africana van Ben.

Haec conchula permagni est momenti ad cognoscenda ea telluris tertiariae sedimenta, quae ex aqua mixta deposita sunt, sic verbi causa ad Moguntiam ad Moenum multisque aliis locis cum Hydrobia (Paludina, Paludinella) acuta frequentissime invenitur.

23. Dreissenia Basteroti Myt. Desh.

„D. testa elongato-angusta, paullulum compressa, laevigata, dorso apiceque carinato-gibbosa; umbonibus acutis, rectis, terminalibus, intus septiferis."

Haec pauca omnino quadrant cum testa ex regione Burdegalensi fossili, quae exstat in collectione nostra.

Mytilus Brardii var. Bast. Bord. 78. no. 2. — M. Basteroti Desh. Lam. an. s. vert. ed. II. pag. 54. — Dreissena Basteroti Nyst (Coq. Belg. p. 265. Tab. XX. fig. 7. a. b. c.) ad aliam speciem pertinere videtur.

24. Dreissenia subcarinata Myt. Desh.

D. testa solida, subtrigona, convexa, carinata, striis rugisque concentricis instructa; margine dorsali recto, $^2/_3$ totius longitudinis conchae aequante; margine postico arcuato, basi antice sinuata, in medio, in ea scilicet parte, qua byssus emittitur, excavata; umbonibus acutis, paullo incurvis; septo crasso, transversim striato cum lamina parvula agnata.

Long. speciminis, quod exstat, 20 lin. Long., alt., lat. ratio 100, 64, 50.

Mytilus subcarinatus Desh. Crim. pag. 62. Tab. 4. fig. 12. 13. — Dreissena subcarinata Nyst Coq. tert. Belg. pag. 264, — Bronn Ind. pal. p. 439.

Species, forma sua Mytilo Balatonico similis, in stratis formationis tertiariae ad Kertsch Russiae occurrit.

25. Dreissenia Balatonica Myt. Goldf.

D. testa magna, crassa, trigona, concentrice rugoso-striata, utrinque carinata, dorso alto arcuato, subangulato, paene compresso; basi antice sinuata; area basali lunulaque cordata; fissura byssi magna et late hiante; umbonibus magnis arcuatis; lamina septo crasso, trigono, transverse striato affixa.

Mytilus palatonicus Goldf. Petref. Germ. II. pag. 172. Tab. CXXX. fig. 2. a. b. c. — Congeria palatonica Partsch Ann. d. Wien. Mus. I. pag. 100. Tab. 12. fig. 9 — 12. — Dreissena palatonica Nyst Coq. tert. Belg. pag. 163. — ?Enocephalus mytiloides Münst. in Keferst. Zeitg. 1831. IX. 92. (ex auctoritate clar. Bronn.)

In stratis tertiariis ad Viennam nec non ad litora lacus Balaton Hungariae occurrit.

26. Dreissenia triangularis Congeria Partsch.

D. testa triangulari, convexa, carinata, concentrice striata; umbonibus inclinatis, incurvis, magnis; septo parvulo.

Congeria triangularis Partsch Ann. d. Wien. Mus. I. pag. 99. Tab. 12. fig. 5 — 8. ex parte. — Dreissena triangularis Nyst Coq. Belg. pag. 264. — Bronn Ind. pal. pag. 439. — Naumann Geogn. Tab. LXVIII. fig. 5.

Forma singularis, lata, triangulo, cujus latera duo aequalia sunt, haud dissimilis.

E formatione Viennensi tertiaria.

27. Dreissenia Partschii Congeria Czjżek.

„D. testa ovali, apicibus simpliciter arcuatis, valvulis crassis, convexis, concentrice striatis, haud schistosis, sine appendice tumescente semilunari.“

Long. spec. adult. fere 24 lin. efficit; saepius minora occurrunt.

Congeria Partschii Czjżek in naturw. Abh. herausg. v. W. Haidinger. vol. III. pag. 129. Tab. XV. — Myt. subglobosus Goldf. Petr. II. pag. 173. Tab. CXXX. fig. 3. a. b. c.

Species magna quasi intermedia inter Dreisseniam subglobosam et spathulatam, quibuscum una occurrit. Cardo ejus Dreisseniae triangulari simillima, sed totus conchae habitus prorsus alienus.

28. Dreissenia subglobosa Congeria Partsch.

D. testa magna, inflata, subtetragona, paene globosa, crassa, concentrice striata et rugosa; umbonibus magnis, tumidis, in callo semilunari testae prominente involutis, margine cardinali et postico (superiore scilicet et inferiore), paene parallelis, latere basali utrinque inflato, cordiformi, medio excavato, fissura ad emittendam byssum magna.

Nomen Enocephali *) carditaeformis Münster in Keferst. Zeitg. 1831. IX. 92. est primum, sed sine charactere editum; cfr. Bronn Ind. pal. pag. 439. — Congeria subglobosa Partsch in Ann. d. Wien. Mus. 1835. I. pag. 93. Tab. 11. fig. 1 — 10. — Mytilus subglobosus Goldf. Petr. Germ. II. pag. 173. Tab. CXXX. fig. 4. a. b. c. (figg. 3. a. b. c., quas clar. Goldfuss pro testis juvenilibus habuit, ad speciem antecedentem pertinent). — Dreissena subgl. Nyst. Coq. Belg. pag. 263. — Dreissenia subglobosa Bronn Leth. geogn. pag. 365. Tab. XXXIX. fig. 13. — Congeria subglobosa Naumann Geogn. Tab. LXVIII. fig. 6.

Species, forma sua singulari insignis, Isocardias quasdam in mentem vocat.

In regione Vindobonensi inprimis ad Brunn cum antecedente occurrit.

Dreissenia inaequivalvis (Mytilus) Desh. Crim. 62. Tab. 5. fig. 1 — 3. Nyst Coq. tert. Belg. pag. 264;

Dreissenia rostriformis (Mytilus) Desh. l. c. 61. Tab. 4. fig. 14 — 16. — Nyst l. c. pag. 264, et

?Dreissenia plebeja (Mytilus) Dub. Volh. 69. Tab. 7. fig. 26 — 28. e stratis arenosis tertiariae cujusdam formationis mihi prorsus ignotae sunt. — Cfr. Bronn Leth. geogn. ed. III. pag. 365.

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*) *αἰνός* immanis, ingens, *κεφαλή*, hinc rectius Aenocephalus monente Herrmannsen Ind. Mal. pag. 422.

His a collega conjunctissimo, viro illustrissimo et amplissimo, supra disputatis addam primum, quae anno praeterito, dum prorectoratu fungebar, memoratu digna in academia nostra evenerunt.

Ante omnia summo numini gratias agimus, quod universitatem nostram salvam et incolumem servavit atque inceptis precibusque nostris favit; tum laeto animo praedicare debemus benevolentiam, quam AUGUSTISSIMUS ET POTENTISSIMUS PRINCEPS AC DOMINUS hoc anno in nos contulit. Etenim jussu ejus nosocomium chirurgicum aedificari coeptum est, quod, ubi ad tectum pervenerit, academiae decori magno erit atque utilitati. Nec minus aedificium ad plantas recipiendas eodem tempore exstrui INDULGENTISSIMUS ET GENEROSISSIMUS PRINCEPS concessit. Sua sponte deinde uno eodemque die salarium sex professorum adauxit. Postremo nobis contigit, ut, quod jam diu speratum erat, ipsum MAGNIFICENTISSIMUM RECTOREM intra moenia nostra conspiceremus et favorem ejus erga academiam nostram sentiremus.

Nullus professorum per ultimum annum academicum a nobis discessit neque alius ad nos accessit, nisi ante hos paucos dies *Augustus Fridericus Christianus Vilmar*, philosophiae Dr., a consiliis ecclesiasticis, vir summe reverendus, qui olim gymnasii apud nos director aetate puerili ad humanitatem informata de academia optime jam meritus, dein hucusque in consessu eorum, qui regendis rebus publicis internis supremo loco praesunt, consilia proponere jussus, nunc literarum studiis redditus, quod et ipsi in summis erat votis, et quod deus bene vortat nobis, juventutem academicam theologiam sacrosanctam docebit. Praeterea his ipsis diebus etiam alium collegam nobis additum esse laetamur,

quem, licet nondum advenerit, silentio praeterire non possum. Postquam enim per multos annos professura linguarum recentiorum vacavit, et saepissime spes fore, ut alius ei praeficeretur, nos fefellit, nunc *Tychoni Mommsen*, philosophiae doctori, hucusque in schola, quam realem vocant, apud Isenacenses professori lectoris et professoris extraordinarii linguarum recentiorum munus demandatum est. Sic apud nos non solum veterum linguarum, sed etiam franco-gallicae et anglicae studiis optime provisum est. Ceterum imminens sane fuit periculum collegae conjunctissimi amittendi, cui sub conditionibus honorificentissimis professura instituti polytechnici apud Helvetios oblata erat, sed praeoptavit vir excellentissimus *Kohlrausch*, id quod nobis maximae est laetitiae, in gremio academiae nostrae permanere ejusque salutem industria, qua uti solet, nobiscum juvare. — Ex iis, qui privatim apud nos docebant, prius abiit *Guilielmus Arnold*, j. u. Dr. vir consultissimus, qui Basileam vocatus, professor ordinarius, jus germanicum studiosis academiae tradit; tum *Frid. Guil. Hassencamp*, theologiae licentiatus, vir reverendus, qui minister verbi divini munus ei mandatum apud Ziegenhainenses suscepit. Ad provinciam, quam idem ex majoribus alumnis prior in seminario Philippino apud nos administraverat, is, qui alterum ejusdem seminarii locum hucusque obtinebat, *Guil. Jul. Mangold*, theologiae licentiatus, vir reverendus, provectus est, cui nunc *Guil. Daniel Wolff*, theologiae candidatus, successit. — Veniam legendi in facultate juridica assecutus est *Joh. Frid. Guil. Mueller*, qua tamen in posterum demum se uti velle indicavit.

Instituta academica incrementa haud parva ceperunt, pecuniis partim extraordinariis muneribusque aucta. Inprimis gratias agere debemus *Francisco Hugoni Hesse*, ab intimis consiliis vectigalium administrandorum et regis Borussorum curatori negotiorum apud Americanos centrales, qui institutum zoologicum multorum eorumque rariorum animalium pellibus pretiosis magnifice donavit. Dein gratissimi accepimus compluria mineralia lapidesque et petrefacta, quae vir

ornatissimus *Carolus Roessler*, Hanoviensis, instituto mineralogico dono dedit.

Numerus civium academiae fere idem mansit atque anno paenultimo. Dolendum est, quod mors immatura quattuor commilitones, qui spem optimam excitaverant, et quorum duo ad metam studiorum academicorum jam pervenerant, nobis eripuit.

More denique pristino prorector novus finito semestri aestivo munus suscipere consueverat, sed ex jussu eorum, qui civitatem summo loco administrant, nunc constitutum est, ut prorector die dominico ante semestris hiberni initium magistratum capessat. Quod quum per tempora prius exequi non liceret, nunc tandem munus, quod hucusque gerebam, in manus successoris rite creati et ab AUGUSTISSIMO PRINCIPE confirmati deponam. Proxime enim instat dies solemnis, quo

vir illustrissimus et amplissimus, magnificus

FRIDERICUS LUDOVICUS STEGMANN

PHILOS. ET MED. DR. IN PHILOSOPHORUM ORDINE P. P. O.

summum academiae magistratum aditurus est. Quibus solemnibus in auditorio majore instituendis ut frequentes adesse, me illumque orantes audire, bonaque vota concipientibus favere velint *magnificus et perillustris Academiae Procancellarius, Professores omnium ordinum summe Reverendi, Illustres et Consultissimi, Experientissimi, Excellentissimi, quotquot praeterea in quocunque honoris ac dignitatis gradu constituti bene Academiae cupiunt et bonis artibus favent, cives denique Minervae sacris operantes ornatissimi ac suavissimi*, omni qua decet humanitate atque observantia oro rogoque.

Marburgi, die XIII. m. Novembris MDCCCLV.

1. Landmollusken,

mit Bemerkungen über die Molluskenfauna der canarischen Inseln überhaupt,
von Herrn Professor **A. Mousson.**

Vor wenigen Jahren noch glaubte man die Landmollusken der Canarien ziemlich erschöpfend zu kennen. Durch die ältern Untersuchungen Maugé's*), durch den Besuch des Hrn. d'Orbigny auf Teneriffa**), bei Anlass seiner Reise nach Südamerika, durch den längern Aufenthalt der Hrn. Webb und Berthelot***) und den spätern des Hrn. Despréaux auf mehreren der grössern Inseln war ein Verzeichniss von 66 Arten und guten Varietäten, worunter 7 sehr zweifelhaften Ursprunges, zusammengekommen. Hr. d'Orbigny†) betrachtete dasselbe als ein auffallend reiches und treues Bild der Molluskenfauna jener Inseln. Indess stand diese Zahl erheblich zurück neben dem Artenreichthum, welche die viel kleinere Madeiragruppe, zufolge den Untersuchungen des Hrn. Lowe, geboten hatte, und neben der Mannigfaltigkeit der Formen, die sich auf Archipellagen grösserer Inseln sonst entwickelt. Sie erwies sich auch später als sehr unvollständig. Ein Aufenthalt von 5 Monaten (1851) von Seiten des ebenso eifrigen als scharfsichtigen, leider verstorbenen Hrn. Blauner von Bern auf den einzigen Inseln Teneriffa und Palma genügte, um 42 neue Arten und Varietäten, einige sogar zu diesen Inseln ganz neuen Typen gehörend, ans Licht zu ziehen. Sie wurden von Hrn. Shuttleworth††) beschrieben und haben die Gesammtzahl der canarischen Arten, mit Inbegriff einiger, die aus den Sammlungen des Hrn. Terver (im Museum von Marseille) und des Hrn. Moquin-Tandon stammen, auf 101 gute Arten und Varietäten, nebst 7 zweifelhaften gehoben.

Dass aber auch diese Zahl mit Rücksicht auf mehrere der Inseln nur eine sehr ungenügende sein kann, beweist die folgende Vergleichung der für jede der grössern

*) Benutzt in den Werken von Ferrussac und Lamark.

**) 1826.

***) Synops. moll. terr. et fluv. etc. Ann. des sc. nat. 1833.

†) Histoire nat. des îles canar. II, 45.

††) Berner. Mittheilungen Nr. 241, 242 und 260, 261.

Inseln authentisch angegebenen Arten, wobei allerdings 7 Arten wegen allgemeiner Verbreitung nicht besonders notirt wurden.

	Teneriffa	Palma	Gomera	Canaria	Lanzarote	Fuertaventura	Ohne Angabe
Limax	2	—	—	—	—	—	—
Parmacella	—	—	—	—	1	1	—
Testacella	1	—	—	1	—	—	—
Vitrina	2	—	—	1	—	—	—
Zonites	2	2	—	—	—	—	—
Helix	22	11	3	11	5	4	7
Busimus	7	1	2	3	1	—	3
Zua	2	1	—	2	—	—	1
Pupa	5	2	—	—	—	—	—
Cyclostoma	2	1	—	—	—	—	—
Pomatias	—	—	—	—	—	—	1
Physa	1	—	—	—	—	—	—
Amylus	1	—	—	—	—	—	—
Hydrocena	1	1	—	—	—	—	—
Tumcatella	1	—	—	—	—	—	—
Pisidium	1	—	—	—	—	—	—
Summa	50	19	5	18	7	5	12

Das häufig besuchte Teneriffa würde also die sieben- und achtfache Artenzahl der nicht viel kleinern, aber selten betretenen östlich liegenden Inseln Lanzarote und Fuertaventura besitzen, ein Missverhältniss, das schwerlich in der Armuth der Natur, sondern wohl nur in der Mangelhaftigkeit unserer Kenntnisse seinen Grund hat. Die letztern, in jeder Hinsicht weniger bebauten, durch ihre östliche Lage eng verknüpften Inseln sind es, welche Hr. Hartung besucht hat. Andere Zwecke verfolgend, sammelte er freilich nur das, was sich ihm zufällig darbot; dennoch hat selbst das Wenige zur sicheren Feststellung der specifischen Merkmale und authentischen Fundorte einiges Interesse.

Von Hrn. d'Orbigny werden für Lanzarote und Fuertaventura die folgenden Arten als eigenthümlich genannt:

Parmacella ambigua Fer.

Helix simulata Fer. — eine orientalische Art, deren Name vermuthlich unrichtig angewandt wurde.

Helix monitifera Webb.

„ *Lancerottensis* Webb.

„ *sarcostoma* Fer.

Ueberdiess werden für sämmtliche Canarien als gemeinsam angegeben:

Helix pisana Müll. — in verschiedenen Varietäten.

„ *plicaria* Lam. — bei der frühern Vermengung mehrerer unterschiedener Formen muss ihre allgemeine Verbreitung als unerwiesen betrachtet werden.

„ *lactea* Müll. — Sie soll nach Webb auf mehrern Inseln selten sein.

Bulimus decollatus Brug.

Physa acuta Drap.

» *fontinalis* Drap. — Hr. Webb bezeichnet diese beiden Arten als allgemein verbreitet.

Hr. Hartung hat nur die folgenden Arten zurückgebracht:

1) *Helix pisana* Müll. — Die typische Form mit starker Perforation, welche von den egyptischen bis zu den spanischen Küsten fast ausschliesslich vorherrscht, artet auf den atlantischen Inseln mehrfach aus. Unter den Hartung'schen Exemplaren der beiden Inseln finden sich drei Formen, die ich als Varietäten aufführe, wiewohl die letzte, ihres eigenthümlichen Habitus willen, von manchen Autoren vielleicht mit Recht als selbständig betrachtet wird.

a) Var. *clauso-inflata* Mss. — kugelig, aufgeblasen, dünn, schwach gestreift; die Perforation durch eine kleine Erhebung des ungeschlagenen Calumellarrandes schwach angedeutet; weiss mit schwachen Linien; bisweilen eine ganz schwache Andeutung gerundeter Kanten oben und unten an der letzten Windung. Die Exemplare sind aus Fuertaventura, sie finden sich aber auch auf Teneriffa.

b) Var. *alboranensis* Webb — characterisirt durch Kleinheit, kugelige Form, früh verschwindende Carina, Verdickung der Schale mit dem Alter, Verengung der Perforation, meist bis zum völligen Verschwinden, Abwesenheit der gelblichen Färbungen, Vorherrschen dagegen grauer wolkiger Farben mit feinen dunkeln Linien. Sie scheint auf dem trocknen Strande beider Inseln zu leben und weicht von den typischen Exemplaren der Alboran-Inseln, ausser durch die noch mehr geschlossene Perforation, wenig oder nicht ab.

c) Var. *geminata* Mss. — Sie unterscheidet sich, als sehr ausgeprägte Varietät, wenn nicht als eigne Art, von der typischen Pisana durch etwas deprimirte Form,

vornehmlich des letzten Umgangs, durch noch schärfere, von Spiralfurchen durchkreuzte feine Rippenstreifung, durch Verschwinden alles Glanzes, durch Mangel an Perforation, oft selbst einer jeden Andeutung derselben und zwar schon von erster Jugend an, endlich durch den abweichenden Character der Färbung, der mehr an alboranensis erinnert. Auf graulich und bräunlich weissem Grunde laufen am Wirbel radial, am Umfange longitudinal Zonen aus feinen, bald ganzen, bald fein unterbrochenen dunklern Spirallinien, die oft eine ungemein zierliche Zeichnung darstellen, und an die verwandte *H. ustulata* Lowe der Salvages-Insel erinnern. Die an Pigment armen Exemplare haben bräunlich-gelbe grelle Zonen mit seltenen Fleckenreihen. Unter etwa 40 Exemplaren aus beiden Inseln fanden sich 8 ganz ungefärbte.

Es ist interessant, diese bedeutenden Abweichungen auf den östlichsten, dem Festlande nächsten Canarien auftreten zu sehen, während Teneriffa, die geschlossene Perforation abgerechnet, schon ziemlich den europäischen Habitus aufweist, und selbst diese Abweichung auf den noch entferntern Madeira- und Azorengruppen wieder verschwindet.

2. *Helix impugnata* Mss.

Testa obtecte perforata convexo-depressa, solidula, lineis rugosis transversis et subtilioribus longitudinalibus reticulata, opaca, griseo-albida, lineolis numerosis brunneis interruptis ornata; spira obtusa subprominula; anfractus 4½—5, superne planiusculi, filo-carinati; ultimus serrulato-carinatus, vix descendens, subtus convexus; apertura, lunato-securiformis; perist. rectum, intus tenuiter labiatum, margine columellari carneo, perforationem semiclaudente. Diam. maj. 12, minor 10½; alt. 8 millim.

Hr. Webb hat diese Art als *H. planata* Chemn., Hr. d'Orbigny als blosse Monstrosität von *pisana* Müll. (l. c. p. 58) bestimmt, beides, wie mir scheint, mit Unrecht. Von *planata*, deren Vaterland nach Pfeiffer (Mon. III, 137) Afrika sein soll, so wie von der ihr verwandten *erithrostoma* Phil. (l. c. III, 137), die aus Marocco stammt, unterscheidet sie sich durch den mehr gehobenen Wirbel, die um Eine geringere Zahl von Windungen, durch die als feiner Faden an allen Windungen hervortretende Carina, durch Mangel an jedem Glanz, in Folge der feinen scharfen Längs- und runzeligen Querfurchung, durch weniger verbreitete Oeffnung, mit beinahe scharfem, wenig verdicktem Peristom, während die Lippe des Basalrandes bei den beiden andern sehr breit ausgebildet und gefärbt ist. — Andererseits scheint das Auftreten dieser Form mit ganz festen Merkmalen, die schon an den jüngsten Exemplaren in der weit plattern Form, der scharfen fadigen Carina und der sehr markirten Perforation offenbar werden, die Trennung von der canarischen *pisana*, die auf der gleichen Insel, wie es

scheint ohne Uebergänge, in Menge vorkommt, hinlänglich zu rechtfertigen. Hingegen ist mir das Verhältniss zu der in den Sammlungen seltenen *H. arietina* Rossm. (Zeitschr. 1846, 17, 2), welche von Dr. Willkom in der spanischen Sierra de S. Cristoval gesammelt wurde, weniger klar und es könnte wohl auf ähnlichen Differenzen beruhen, wie diejenigen zwischen unserer Var. *geminata* und der typischen *pisana*, nämlich auf der schärfern Sculptur und dem abweichenden Färbungscharacter. Wäre indess, wie Hr. Pfeiffer vermuthet (Monogr. I, 176) *arietina* mit *planata* Ch. zu vereinigen, so kann die Verwandtschaft mit unserer Form weniger gross sein.

3. *Helix granostriata* Mss.

Testa umbilicata, lenticularis, solidula, transverse seriatim granulata et sulculata, opaca, griseo-albida, unicolor vel interrupte fusco-bifasciata; spira depresso-conica, summo corneo; anfractus 5—5½ superne plani, filocarinati; carina subserrulata; ultimus non descendens, infra vix convexiusculus; umbilicus parvus, ⅛ diametri non superans; apertura securiformis; peristom. rectum, intus labiatum, marginibus non approximatis, columnellari non reflexo.

Diam. maj. 8, minor 6½, alt. 3—3½ millim.

Auf den ersten Blick erinnert diese zierliche Art an *H. setubalensis* Pfr. oder an die freilich scalar ausgebildete *argonautula* Webb (Orb. II, 64); beide aber haben eine convexere Unterseite, einen viel weitern Nabel, eine viel grobere Rippenstreifung und mehr herausstehende Carina; dann fehlen ihnen gänzlich die zierlichen Körnerreihen in der Richtung der Anwachsstreifen, welche eine schwache Annäherung an die maderensische Polymorpha-Gruppe andeuten. Die beiden dunkeln unterbrochenen Binden, auf der Ober- und Unterseite hinlaufend und nach dem Wirbel in hornartige Flecken sich auflösend, erinnern an die Färbungen der Gruppe von *Helix tumulorum*, mit deren Gliedern indess keine Verwechslung möglich ist.

Auch diese Art fand sich auf beiden Inseln. Das Exemplar von Fuertaventura ist etwas stärker gebaut und stärker sculpturirt als das andere von Lanzarote, theilt aber alle weiteren Merkmale desselben.

4. *Helix persimilis* Schuttl. (Diagn. n. Moll. 1852. I, 7.) Einzelne Exemplare dieser auf Lanzarote gefundenen Art sind von denen, welche Hr. Blauner auf Palma gesammelt hat, nicht zu unterscheiden; im Durchschnitt jedoch sind sie etwas kugeliger, fester und kalkiger. Alle übrigen Merkmale stimmen genau überein.

5. *Helix monilifera* Webb. Ein auf Lanzarote gefundenes Exemplar halte ich für die ächte von Hrn. Webb von ebendaher gebrachte Art, mit welcher die vorige jedenfalls nahe verwandt ist. Die Schale ist immerhin noch etwas kugeliger als

letztere, etwas grösser, weiss und kalkig, mit weniger deutlicher Streifung, aber narbigen, besonders an der Unterseite deutlichen Eindrücken, dabei etwas glänzend. Die dunkeln Binden sind weniger zusammenhängend, in Punkte aufgelöst; die Perforation erscheint von dem Lippenumschlage, der sich von der Columelle bis jenseits der Basis ausdehnt, beinahe geschlossen. Eine ziemlich starke, weisse Lippe folgt innen dem Peristom.

6. *Helix Despreauxii* d'Orb. — Die ursprüngliche Form stammt von Canaria, die von Hrn. Hartung gebrachte, welche mir, einiger Abweichungen ungeachtet, nur Varietät zu sein scheint, von Lanzarote. Sie differenzirt sich folgendermassen:

Var. *moderata* Mss.

Testa depresso-conica, fortiter perforata, bicarinata, carinis magis compressis et productis, secunda subtiliore; basis tuberculis granosis ornata.

Die Hauptmerkmale sind die nämlichen, nur weniger ausgeprägt. Die Gesammtform ist flacher, mit einer platt hervortretenden Hauptcarina, die mehr eingesägt als warzig gezähnt erscheint; die zweite Carina tritt in einigen Exemplaren nur wenig, in andern so stark wie die erste hervor; die dicken runzeligen Warzen der Unterseite verwandeln sich mehr in grobe Körner auf fein gestreiftem Grunde. Eines der Exemplare hat eine dunkle Oberseite, mit weiss abstechender Carina.

7. *Helix paupercula* Lowe. — Diese kleine durch ihre zerdrückte Gestalt und zusammengeschnürte, runde Oeffnung sonderbare Art kommt in zwei Varietäten vor. Auf den Azoren (Insel Fayal) und im subfossilen, selten im lebenden Zustande auf Porto Santo hat sie bei geringerer Grösse ein flacheres Gehäuse mit wenig granulirter Oberfläche, vorzüglich aber mit einer von einem warzigen Zahne verengten Oeffnung, welcher von der wulstigen Lippe des rechten Randes ausgeht. Die auf Porto Santo vorherrschend lebendige Form hat kaum eine Andeutung der Warze; derjenigen Madeira's fehlt dieselbe ganz, dabei ist das Gehäuse weniger plattgedrückt, der Nabel enger, die letzte Windung weniger kantig und unten convexer, die Oeffnung weniger flachliegend, die Oberfläche deutlicher schagrinirt. Diese zweite Varietät fand sich in wenigen Exemplaren unter den Gegenständen von Lanzarote.

8. *Helix sarcostoma* Webb. — Diese schöne wohlbekannte Art wurde von den Hrn. W. und B. auf den beiden Inseln entdeckt, von welchen Hr. Hartung sie zurückgebracht hat. An einigen Exemplaren liegt die Mündung auffallend flach an der Basis des Gehäuses und hat einen mehr als eine Linie breiten flach umgeschlagenen Rand.

9. *Bulimus decollatus* Brug. — Unterscheidet sich nicht von den europäischen Formen. Sämmtliche Exemplare, sowie die meisten von *H. sarcostoma* und manche von *H. pisana alboranensis* befinden sich in einem weissen, halbverkalkten Zustande, den man halbfossil nennen möchte, derselbe scheint aber nicht sowohl eine Wirkung des Alters, als des Verweilens im heissen Küstensande zu sein.

Von den 9 durch Hrn. Hartung gesammelten Arten ist also eine, *Helix granostriata*, ganz neu; *H. pisana geminata*, *H. impugnata*, *H. monilifera*, *H. Despreauxii moderata*, *H. sarcostoma*, obschon längst bekannt, scheinen den beiden Inseln eigenthümlich; nur *H. persimilis* und *pisana alboranensis* sind auch für andere Inseln genannt worden, während *B. decollatus* den sämmtlichen Mittelmeerländern gemein ist. Nach diesen Resultaten darf man auf fernere Entdeckungen hoffen, wenn Hr. Hartung sein Vorhaben eines nochmaligen Besuches jener beiden Inseln und der Erforschung anderer der weniger bekannten Canarien, zur Ausführung bringt. Erst nach Vervollständigung unserer Kenntnisse wird es möglich werden, die Eigenthümlichkeiten der canarischen Molluskenfauna und ihre interessanten Beziehungen zu denjenigen einerseits der europäischen und afrikanischen Küsten, anderseits der übrigen atlantischen Inselgruppen umfassend und naturgemäss darzustellen. Ich beschränke mich gegenwärtig auf einige wenige Andeutungen.

Lage, Clima, vulkanischer Boden, Vegetation nähern die Canarien sehr der Gruppe von Madeira: um so auffallender ist es, die Molluskenfauna bedeutend abweichend und derjenigen der mittelländischen Continentalküste näher verwandt zu sehen. Mit Ausnahme einer Reihe von Arten *(Helix cellaria, lenticula, pisana, aspersa, lactea, Bul. decollatus)*, welche vom Orient bis Portugal die Mittelmeerküsten begleiten, haben die Canarien und Madeira vermuthlich ausser *H. paupercula* keine einzige Art gemein, wenigstens keine, die nicht auch dem Continent angehörte. Alle ältern Angaben (z. B. *H. tiarella*) beruhen auf unsichern Bestimmungen oder unrichtigen Vaterlandsangaben. Noch mehr, selbst die vorherrschenden Typen sind auf beiden Inselgruppen verschieden, so dass diejenigen Typen, die auf der einen in reichster Mannigfaltigkeit sich entwickeln, auf der andern kaum durch einzelne verlorne Arten, wohl auch gar nicht repräsentirt sind.

So bilden auf Madeira und Porto Santo folgende Typen die Grundlage der Heliceenbevölkerung:

1) Die Beck'sche Abtheilung *Ochthephyla*, welche Hr. Albers in die Gruppen

Tectula, *Ochthephyla* und *Actinella* zertheilt hat und zu der z. B. *H. turricula*, *maderensis*, *arcta*, *polymorpha*, *Bulweriana* etc. gehören, umfasst auf der Madeiragruppe nicht weniger als 33 Arten. Auf den Canarien trägt einzig *H. taeniata* Webb die ausgeprägteu Merkmale des Typus; diese Art aber gehört zu den bestrittenen, da sie nicht an Ort und Stelle gesammelt, sondern in Orseille-Ballen, nicht näher bekannten Ursprunges, gefunden wurde (Orb. l. c. p. 63).

2) Die Lowe'schen Gruppen *Leptaxis* und *Plebecula*, welche um die Arten *erubescens*, *punctulata* und *undata* Low. sich ordnen und gegen 14 Arten umfassen. Diesem Typus nähert sich einzig die canarische *H. advena* Webb (d'Orb. p. 58), die sogar direkt von Hrn. Albers *(Maloc. maderens. p. 49)* für Porto Santo genannt wird. Vergleicht man indess die authentische Form von Hrn. Webb (d'Orb. T. 1, f. 18 bis 20) mit der Abbildung, welche Hr. Albers (T. 2, f. 26, 27) von der Porto Santo's gibt, so wird man beide schwerlich für identisch hetrachten können.

3) Die in 3 Formen, theils lebend, theils subfossil auf der Madeiragruppe vorkommende Abtheilung der Campyleen besitzt auf den Canarien keinen einzigen rein ausgeprägten Stellvertreter; denn die sich etwas annähernde *H. Villiersi* d'Orb. muss eher als Gränzform des Plicaria-Typus betrachtet werden.

4) Auf Madeira kommen eine Reihe Clausilien vor, alle eigenthümlich, aber dennoch Vertreter des so artenreichen europäischen Genus; von den Canarien haben weder die Untersuchungen des Hrn. Webb und Berthelot, noch die für Teneriffa erschöpfenden des Hrn. Blauner auch nur Eine Art ans Licht gefördert.

5) Das Genus Pupa hat auf der Madeiragruppe eine reiche Entwicklung in etwa 20 sehr eigenthümlichen Formen, von denen nur eine, *P. ancostoma*, mit einer europäischen Art zu identificiren ist. Von den Canarien führt Hr. d'Orbigny nur zwei Arten auf: die zu einem fremden südlichen Typus gehörende *P. dealbata* Webb und die ihrem Fundorte nach sehr zweifelhafte *P. maculosa* Low. Hr. Blauner hat drei kleine Formen hinzugefügt, deren eine, *P. atomus* Sh., der europäischen *P. minutissima* nahe steht, während die beiden andern *(taeniata* und *castanea* Sh.) sich allerdings der madeirensischen *cheilogona* und *irrigua* Lowe annähern.

Interessant ist es, 3 Typen, welche man bisher als ganz eigenthümliche der Madeiragruppe betrachtete, nach Hrn. Blauners schönen Entdeckungen nun auch auf den Canarien, doch wieder in eigenen Arten, repräsentirt zu finden, nämlich:

1) die Gruppe von *H. bifrons* L., zu welcher *H. Pompylia* Sh. zu zählen ist;

2) der merkwürdige Typus der zartschaligen kantigen *H. Webbiana* L., an welche

H. cuticula Sh. sich reiht;

3) endlich die sonderbare Cyclostomagruppe *Craspedopoma*, welche auf der Madeiragruppe die beiden Arten *C. lucidum* und *Lyonetianum* Lowe getrieben hat, und nun auf Teneriffa als *C. costatum* Sh. auftritt.

Auf den Canarien dominiren ganz andere Typen als die vorgenannten, unter denen folgende sich hervorheben lassen:

1) Der Typus von *H. sarcostoma* W. mit Inbegriff von *malleata* und *consobrina* Fer. Er steht wohl am nächsten der südeuropäischen *H. vermiculata* M., welche selbst merkwürdiger Weise im Gegensatz von *H. lactea* M. weder auf Madeira, noch auf den Canarien gefunden worden, auf letzterer sogar durch keine verwandte Form vertreten ist.

2) Ebenso fehlt auf der Madeiragruppe ganz der auf den Canarien in 6 Arten sich verzweigende Typus von *plicaria* Low.

3) Recht eigenthümlich und durch eine Reihe von Arten vom Kugeligen bis Kantigen sich vervielfältigend ist für die Canarien die Gruppe von *monilifera* und *tumulorum* Webb. Auf Madeira, freilich aber auch in den Mittelmeerländern, fehlt sie ganz, wenigstens in schärferer Ausbildung.

4) Die Arten *cyclodon* Webb., *Despreauxii* d'Orb., *moderata* Mss., *argonautula* W., *granostriata* Mss. haben auf der Madeiragruppe keine Schwesterformen; hingegen schliessen sie sich, freilich als gut unterschiedene Formen, an südeuropäische Typen.

5) Aehnliches gilt von den hornartigen *H. diaphana* Low., *afficta* Fer., *fortunata* und *discobolus* Sh., *hispidula* Lam. Mit Ausnahme der allgemein verbreiteten *H. lenticula* Fer. findet sich auf Madeira nichts Aehnliches: wogegen die südeuropäischen *H. lens* und *ciliata* näher verwandt sind.

6) Die artenreichen Bulimusgruppen von *obesatus* und *variatus* Webb. schliessen sich an die europäischen *B. montanus* und *obscurus*, fehlen aber ganz auf Madeira und Porto Santo; auffallenderweise finden sie dann wieder, freilich bedeutend abweichend, im *B. cyaneus* Alb. einen Repräsentanten auf den Azoren.

7) *Cyclostoma laevigata* W. gehört zum Typus des auf den Canarien gleichfalls vorkommenden europäischen *C. elegans*, der für die maderensischen Inseln nicht genannt wird.

Diese wenigen Andeutungen mögen genügen, um die Selbständigkeit der canarischen Fauna gegenüber sowohl der südeuropäischen, als der Maderensischen, zugleich

aber auch die weit grössere Verwandtschaft zu der ersten als zu der letzten darzuthun. Um die Characterisirung und Vergleichung vollständiger durchzuführen, bedarf es indess nach drei Seiten einer Bereicherung unserer Kenntnisse: erstens mit Hinsicht auf die Arten der weniger besuchten Canarien, da, mit Ausnahme von Teneriffa und Palma, wirklich keine als erschöpfend erforscht betrachtet werden kann; zweitens in Bezug auf die Molluskenfauna der Capverdischen Inseln, welche letzteren nach ihrer Lage gegen das Festland mit den Canarien die meiste Aehnlichkeit haben müssen, wiewohl südlichere Breite und grössere Annäherung zum Continente ihren Einfluss ausüben werden; drittens endlich rücksichtlich der Arten der nächstliegend afrikanischen Festlandküsten, von welchen Arten nur wenige der grössern oder durch den Handel verbreiteten, nicht aber das weit zahlreichere Heer der kleinern bekannt ist. Es wäre sehr zu wünschen, dass künftige Forschungen nach diesen drei Seiten hin gerichtet werden könnten.

IDEEN

ÜBER DIE

GEBILDE DER CLAUSILIEN

VON

FORTUNAT FORSTER,

MITGLIED UND CONSERVATOR HERBARII DER KÖNIGL. BOTAN. GESELLSCHAFT ZU REGENSBURG.

MIT 1 STEINDRUCKTAFEL.

Bei der Akademie eingegangen den 4. *Januar* 1836.

ODEN

ÜBER DIE

HEILIGE DER CLAUSTHALER

VON

TOINETTA TOINETTE.

HOFRATH UND CONSERVATOR DER KÖNIGL. NATUR. CURIOSITÄTEN-SAMMLUNG ZU HERCYNOPOLIS

MIT 2 STEINDRUCKTAFELN.

Aus der Akademie eingegangen den 6. Januar 1836.

§ 1.

Die Gebilde der *Clausilia ventricosa.* *)

Die Fortschritte, welche die Naturwissenschaft seit wenigen Jahren gemacht hat, sind in der That riesenhaft zu nennen: wer auf der Bahn des Wissens nur einen Augenblick stille stehet, kann dem raschen Fluge unserer grossen Geister nur noch mit Mühe von ferne folgen; aber hinsichtlich der *Clausilia ventricosa* hat man, wie mir scheint, in der Conchyliologie doch noch einige Lücken gelassen.

In der Gegend von Regensburg kommt eine ungeheuere Masse von Clausilien vor, welche nach ihren äusseren Kennzeichen als *Clausilia ventricosa* bestimmt wurden. Sie zeichnen sich nicht durch auffallende Merkmale aus, wie andere, z. B. *Clausilia plicata* durch Lamellen, sondern sind ganz einfach und wurden daher alle unter eine Art gerechnet, obwohl sie im Inneren des Mundes, zwischen den beiden Spindel-Lamellen, ganz verschiedene Gebilde haben. Diese Gebilde, obschon sie weit standhafter sind, als die bisher angegebenen

*) Gegenwärtigen Aufsatz habe ich schon zu Ende des Januars 1835 vollendet, aber liegen gelassen. Erst später erschien des vortrefflichen Rossmässler's Iconographie der Land- und Süsswasserschnecken, welche von Seite 77–78 klar beweiset, dass zwischen der *Clausilia similis* und *ventricosa* keine Form bestimmt ist. Wenn also bei anderen aufgeführten Arten diese Formen durch die Mundtheile bestimmt sind, so müssen auch bei diesen zweifelhaften Arten die Mundtheile entscheiden, und meine Ansichten und Ideen scheinen sich gerechtfertiget zu haben; weswegen ich keinen Anstand nahm, diese wenigen Blätter dem gelehrten Publicum vorzulegen.

Kennzeichen, fand ich noch in keiner Diagnose beschrieben, noch sind sie selbst in den schönsten mit Kupfertafeln versehenen Werken berücksichtiget worden. Wären diese Gebilde nicht so ständig, würde ich es nie gewagt haben, meine Untersuchungen einem sachkundigen Publicum zur geneigten Prüfung vorzulegen.

Selbst in Regensburg sind mehrere Conchylien-Sammlungen angelegt, wo mir freundlich der freie Zutritt gestattet wurde, und überall fand ich die *Cl. ventricosa* unter verschiedenen Gebilden eingelegt.

Ich betrachte die Clausilien von einem ganz anderen Standpuncte als die übrigen Landschnecken: denn der Bau und die innere Einrichtung ihrer kleinen Wohnungen ist weit kunstreicher, als jene der übrigen Schnecken, welches ich durch den Aufsatz in der Isis vom Jahre 1834, S. 479, hinsichtlich der angebrachten Klappe, zu beweisen suchte.

Noch auffallender und bewundernswürdiger ist der Bau der Mündung auf einem Raume von etwa zwei Quadrat-Linien, wodurch die Natur verschiedene Gebilde erzeugt.

Wenn man in Erwägung zieht, wie schwankend bei mancher Clausilien-Art die angegebenen Kennzeichen sind, so ist es wirklich ein Wunder, wie man gerade den wichtigsten Theil, das Innere der Mündung, übersehen konnte. Noch auffallender aber ist dieses bei der *Cl. ventricosa,* welche so sehr an Gestalt und Form wechselt, dass man nicht weiss, welches von tausend Exemplaren die wahre *Cl. ventricosa* sein soll.

Nicht ich allein, sondern mehrere geehrte Sammler von hier, haben diese Clausilien-Art von Ferne her sich verschafft; sie hatten alle die Einfachheit und so ziemlich das Aeussere der Form miteinander gemein, aber an Gebilden im Inneren der Mündung waren sie sehr verschieden, und wie kann man bei einer solchen Verschiedenheit gleichgiltig bleiben und der Sache nicht näher auf den Grund sehen?

Ich nahm meine Zuflucht zu den köstlichen Werken von Drapernaud und Pfeiffer, aber, ich muss es offenherzig gestehen, beide befriedigten meine Wissbegierde nicht. Beide sprechen blos von ganz zufälligen Kennzeichen, als von der Farbe, diese ist aber nichts weniger als ständig. Von den Umgängen gibt Drapernaud 11–12 an, Pfeiffer aber bestimmt 12. Auch diese Merkmale sind also unsicher. Beide stimmen zwar darin überein, dass sie bauchig *(ventricosa)* sei; allein es gibt der Clausilien noch viele, welche auch bauchig sind.

Die starke Streifung kommt mehreren zu, die Nabelritze ist fast bei allen Clausilien tief, und die Rückenwulst bei mehreren erhaben. Sie stimmen darin überein, dass die Mündung eirund ist; diese Form ist aber sehr gewöhnlich. Von den zwei Spindel-Lamellen ist die eine weit vorgerückt, die andere weit zurückgesetzt; diese Angabe passt auf so viele! Das Peristom ist weiss; dieser Fall kommt am häufigsten vor.

Aus diesem geht hervor, dass die Bestimmung, wie diese beiden Schriftsteller sie geben, blos auf sehr wankende Merkmale gebaut ist; und als diese beiden grossen Conchyliologen diese Bestimmung getroffen haben, hat wahrscheinlich jeder eine *Clausilia* vor sich gehabt, deren Gebilde von jener des Andern verschieden waren.

Wenn nun auch unter den tausend Clausilien, welche ich gesehen habe, wirklich die *Cl. ventricosa* begriffen ist, so entstehet dann wieder die Frage: Wie heissen denn die übrigen Clausilien, deren Gebilde wieder anders gestaltet sind, als die, welche als die wahre *Cl. ventricosa* bestimmt angenommen ist?

Eine Definition, welche auf so schwankende Unterscheidungs-Merkmale sich stützt, wie die sind, welche ich vorhin gezeigt habe, gibt keinen richtigen Begriff *(conceptus)*, weil die Merkmale auf mehrere passen. Die von Drapernaud und Pfeiffer angegebenen Merkmale geben uns die Vorstellung von einer Clausilie überhaupt,

wie wir zum Beispiel die Vorstellung von einem Baume haben. Wir haben aber dadurch noch keine Vorstellung von denjenigen Merkmalen, welche einen blos in unserer geistigen inneren Anschauung lebenden Baum von jedem anderen Baume deutlich unterscheiden.

Analysiren wir nun durch wirkliche Anschauung, indem wir seine Staubfäden in der Blüthe zählen, den Stamm nach allen seinen Verhältnissen betrachten, die Blätter bemerken, ob sie wollig oder haarig u.s.w. sind, haben wir nun erst von der Art dieses Gewächses einen deutlichen Begriff, und können dann jeden anderen Baum, welcher dem Unsrigen gleicht, d.h. welcher in seinen Merkmalen ganz mit dem Unsrigen übereinstimmt, von allen übrigen Bäumen unterscheiden; so lange aber unsere Merkmale schwankend sind und nur einen allgemeinen Begriff geben, so lange können wir Art von Art, Gebilde von Gebilde nicht trennen.

Wenn nun die angegebenen Unterscheidungs-Kennzeichen zu allgemein sind, so muss die Natur auf eine andere Art für ständige Kennzeichen (ich rede hier blos von gesunden Exemplaren) Sorge getragen haben, und dass sie dieses auch wirklich that, wird die hier beigefügte Tafel hinlänglich zur Ueberzeugung bringen. Sie hat diesen Wunsch so genau erfüllt, dass diejenigen Kennzeichen, als Farbe, Umgänge, Streifung u.s.w., welche bisher als die wichtigsten angeführt wurden, nur als zufällig erscheinen, und nur als Nebenbezeichnungen betrachtet werden dürfen; denn Merkmale, welche sich in einer und derselben Art so oft und so gleichförmig wiederholen, tragen gewiss den Stempel der Ständigkeit.

Gleichwie es Geschlechter und Arten im Pflanzen-, Thier- und Mineralreiche gibt, welche oft nur durch geringe, kaum bemerkbare Unterscheidungs-Kennzeichen von einander gesondert sind, eben so können ja auch bei der *Cl. ventricosa* ganz unbedeutende Gebilde vorkommen, welche hier einen Unterschied geltend machen.

Den Unterschied zwischen ***Hylesinus*** und ***Bostrichus*** macht nur ein kleines Kölbchen am Fühler aus, wovon das eine ganz, das andere eingeschnitten ist. Weil sich aber diese Formen tausendmal wiederholen, hat man sie mit Recht von einander getrennt, und es fällt Niemanden ein, diese Verschiedenheit für ein blosses Spiel der Natur zu halten.

Der Name ***Curculio*** ist aus den neueren Systemen gänzlich verschwunden; nur wenigen Schmetterlingen gebührt mehr der Name ***Papilio, Sphynx*** u.s.w. Es sind eine Menge Arten entstanden, welche dem Anscheine nach nur einer Kleinigkeit diese Trennung verdanken. Wie klein sind oft die Unterschiede bei gewissen Pflanzen, so, dass Jahrzehnte dazu gehörten, um diese Unterscheidungs-Merkmale zu finden, und wer bürgt uns dafür, ob in einem Jahrzehnte nicht neue Arten gefunden werden. Man wird sich vielleicht wundern, wie es möglich war, dass wir diesen Unterschied so lange nicht finden konnten.

Wenn ich Jemand, der von einem Pflanzensysteme gar keinen Begriff hat, zweierlei Blumen vorhalte, wird er unbefangen sagen, dass sie verschieden sind, dass z. B. die eine eine Rose, die andere eine Nelke sei. Er hat nämlich von jeder der beiden Arten ein treues Bild seinem Gedächtnisse eingeprägt, und nach diesen festgehaltenen Gebilden unterscheidet er ganz richtig, weil sie sehr auffallend sind. Die Verschiedenheit auffallender Gebilde kann also jeder Unkundige erkennen, ohne eigentlich alle Unterscheidungs-Merkmale, wie der Naturforscher, aufzählen zu können; wenn wir ihm also eine ***Clausilia*** im vergrösserten Maassstabe vorzeichnen, welche in der Mündung ein Herz, und eine andere, welche ein Viereck vorstellt, so wird er ohne Schwierigkeit diesen Unterschied der Gebilde erkennen.

Die ***Clausilia biplicata*** und ***Cl. plicatula*** zählen einige zu der ***Cl. ventricosa,*** obwohl sie mir eben so weit von einander verschieden

zu sein scheinen, als die Rose von der Nelke; — nicht etwa, weil die *Cl. plicatula* kleiner ist, oder weil sie nicht, wie die *Cl. biplicata*, einen Winkel hat u. s. w. — (denn diese Merkmale rechne ich zu den zufälligen), — sondern weil der innere Bau des Mundes bei beiden sehr auffallend verschieden ist.

Der unbefangene Naturforscher, der den Reichthum und die fruchtbare Abwechselung der Natur aus ihren Werken kennt, wird sich nicht wundern, dass sie auf dem kleinsten Spielraume eine Menge Gebilde hervorzubringen vermag, da sie es in den drei Reichen der Schöpfung hinlänglich bewiesen hat.

Aus diesem Grunde bitte ich meine gütigen Leser, mich nicht so zu verstehen, als wolle ich neue Species machen, denn der Mensch soll der Natur keinen Zwang anlegen, und Arten suchen, wo keine sind; er darf aber auch nicht freveln und eine bestimmte Zahl vorschreiben wollen, wie viele Arten sie machen darf. Es gibt Männer, welche sich bei Entdeckung einer neuen Art ganz unbehaglich finden; sie sehen sich aus ihrem lange gewohnten Systeme gleichsam hinausgeworfen und wollen sich von ihrer bequemen Lage nicht vertreiben lassen. Es gibt aber auch Männer, welche entweder aus wirklicher Täuschung, oder aus Sucht zu glänzen, eine Menge Arten herauskünsteln wollen. Beides ist Unrecht und der gründliche Naturforscher wird beide Extreme zu vermeiden wissen.

Ich bin weit entfernt, die aufgefundenen Gebilde als wirkliche Arten angeben zu wollen, denn ich nenne die verschiedenen Formen, welche die uns bekannte *Cl. ventricosa* hat, nur Gebilde, nicht Arten. Es möchte zwar auffallend und dem oben Gesagten widersprechend scheinen, dass ich es wagte, jeder solchen Clausilie einen specifischen Namen zu geben, allein mein Zweck war nun einmal, auf die Verschiedenheit der Gebilde aufmerksam zu machen, und ich hätte ihn nicht erreichen können, wenn ich diese Gebilde durch die von ihrer Form

hergenommenen Namen nicht von einander geschieden hätte. Wie hätte ich die Unterscheidungs-Kennzeichen feststellen können, wenn ich mich nicht an einen Namen gebunden hätte? Ich wollte mit diesen Namen nur feste Puncte vorstellen, woran ich meine Ideen knüpfte, nicht aber unbescheiden auftreten, ehe noch Gelehrte entschieden haben. Ich glaube jedoch, mich über meine Ansichten hinsichtlich der verschiedenen Gebilde der *Cl. ventricosa* rechtfertigen zu müssen, man könnte es sonst an mir tadeln, dass ich es wagte, der allgemeinen Meinung zu widersprechen; allein der Umstand, dass mehrere Kenner schon einen Unterschied ahneten, weil diese Clausilien-Art unter so verschiedenen äusserlichen Formen vorkommt, und der, dass ich über tausend Exemplare untersuchte, welche sich alle auf die verschiedenen Formen und Gebilde, welche auf der Tafel angeführt sind, reduciren lassen, — diese Umstände werden allein schon als Entschuldigungsgründe für mich sprechen.

Ferner habe ich die nicht uninteressante Bemerkung gemacht, dass die von mir entdeckten Gebilde sich auch bei solchen Individuen immer gleich bleiben, welche schon eine entschiedenere Bestimmung haben, als die *Cl. ventricosa;* z.B. ist der Schild der *Cl. rugosa* immer in allen Exemplaren gleich, eben so bei der *Cl. plicata, Cl. bidens* u.a.m. Dieses ist aber bei der bis jetzt bekannten *Cl. ventricosa* nicht der Fall. Die Gebilde dieser Art sind nun einmal verschieden, während die anderer Arten immer gleich sind, folglich können die Gebilde der *Cl. ventricosa* keine Spielarten sein, und deswegen hielt ich die Mannigfaltigkeit dieser sich immer gleichförmig wiederholenden Gebilde für aller Aufmerksamkeit werth und nahm daher keinen Anstand, das Naturgeheimniss aufzudecken, nicht um etwas zu schreiben — denn das ist heut zu Tage nichts Auffallendes — sondern um näheren Aufschluss zu erhalten, und von einsichtsvolleren Männern hierüber belehrt zu werden.

Hat sich die Natur bei gewissen Arten an ein bestimmtes Gebilde fest gehalten, warum soll sie dieses nur bei einer einzigen Art — der *Cl. ventricosa* — vernachlässiget haben? Damit aber aller Verdacht der Parteilichkeit wegfalle, und damit man nicht sagen könne, ich habe vielleicht nicht immer die *Cl. ventricosa* vor mir gehabt, so muss ich bemerken, dass die *Cl. ventricosa* auch von der Ferne, von München, Passau u. a. O. her, verschrieben wurde, und dass diese Ankömmlinge, eben wie die hiesigen, von verschiedenen Gebilden waren, welche mit meinen verschiedenen Gebilden im Einklange standen.

Das Edelste an den Clausilien kann wohl nicht die Farbe, nicht die Streifung, nicht die Windungen und deren Zahl, oder die Spindel-Spitze sein, sondern ich glaube vielmehr, es habe die Natur mehr Kunst auf den innern Bau der Mündung und auf die beiden Spindel-Lamellen verwendet, welche mir wie dasjenige vorkommen, was wir am Gesteine Krystallisation nennen. Sie treten erhaben hervor, sind fester, feiner, und zeichnen sich durch eine von der übrigen Schale verschiedene Farbe aus.

Im Mineralreiche bewundern wir mit Recht die Krystalle und ihre verschiedenen Formen. Diese bleiben sich hinsichtlich der Winkel einer jeden Art so gleich (wenn nämlich die Mischung der Bestandtheile und die Temperatur gleich ist), dass man diese Winkel sogar messen und die Grade derselben genau angeben kann. Warum soll man den Spindel-Lamellen ein gewisses Verhältniss absprechen? Ueberall, selbst bei der Bienenzelle, beobachtet die Natur ein regelmässiges Verhältniss der Winkel, warum soll sie nur die Clausilien verwahrlost haben? Missbildungen können diese verschiedenen Gestaltungen der *Cl. ventricosa* nicht sein, denn diese beruhen auf einer gänzlichen Abweichung von der gewöhnlichen Bildungsform, und da eben deswegen äusserst selten eine der andern vollkommen gleicht, so lassen sie sich auch in keine Classification bringen; was sich aber so

mannichfaltig verändert, und bei verschiedenen Individuen immer wieder regelmässig zurückkehrt, muss auf besondere Arten hindeuten.

Der Kelch der *Vicia*-Arten hat fünf Zähne, während jener der *Robinia* nur vier aufzuweisen hat. Wie unbedeutend ist dieser Unterschied, und doch wiederholt er sich bei allen Individuen. Erscheint die eine oder die andere Art anders, ist es eine Missbildung. Soll dieser Fall nicht auch bei den Clausilien eben so gut stattfinden, wie bei den Pflanzen?

§ 2.

Von der Terminologie.

Die eigentliche Kunstsprache ist längst bestimmt, und um alle Verwirrung zu vermeiden, habe ich sie rein bewahrt, und in den folgenden Diagnosen, so weit es möglich war, beibehalten. Da ich aber auf Merkmale gestossen bin, welche bisher noch gar nicht berücksichtiget wurden, und bis jetzt noch mit keinem Namen versehen sind, so war ich wohl genöthigt, diese Merkmale zu benennen, wenn ich mich anders verständlich machen wollte.

Ich führe nun diese Merkmale an, und verweise zugleich auf die Figur *A* der Taf LVIII.

1) Die obere Spindellamelle. Man betrachtet hiebei:

a) die Basis; sie besteht aus dem Theile, welcher unten auf dem Boden aufliegt, und vom Ansatze an der Spindelwand einwärts gegen den Hintergrund zu fortläuft (Fig. *A. a, b.*);

b) die Erhabenheit; die Spindellamellen können erhaben sein, wenn nämlich der obere Rand (Leiste) dieser Lamellen die Basis weit unter sich lässt;

c) die Niedrigkeit, wenn nämlich der obere Rand (Leiste) der Basis näher ist;

d) die Länge und Kürze; die Länge ist die lange oder kurze Entfernung des Endpunctes einer Lamelle, vom Anheftungspuncte an gegen das Innere;

e) die Leiste; sie ist der Oberrand einer Spindellamelle (denn die untere Spindellamelle hat gleiche Eigenschaften in dieser Beziehung) und ist der Basis entgegengesetzt. Sie ist 1) höckerig, wenn vorne bei'm Ansatze der Lamelle ein kleiner Höcker sitzt; wie z. B. bei frischen Exemplaren der *Clausilia rugosa*. — 2) Ausgeschweift, wenn nämlich die Leiste in einem kleinen Bogen sich herabsenkt gegen die Basis, und wieder bogenförmig aufsteigt. — 3) Gerade, wenn sie vom Ansatze horizontal gegen Innen läuft. — 4) Gesenkt, wenn sie sich gegen Innen schief abwärts neigt. — 5) Bogenförmig, wenn sich die Lamelle in einem Bogen stark auswärts (gegen die Nabelwand) bieget. — 6) Gefärbt, wenn sie eine andere Farbe annimmt, als gewöhnlich.

2) Der Boden. (Fig. *A. i, m.*) Er ist der Grund, worauf die Spindellamellen festsitzen, und ist entweder 1) gewölbt, oder 2) eben.

3) Die untere Spindellamelle. Sie fängt in der Regel bei'm unteren Mundsaume an und erstreckt sich in's Innere. (Fig. *A. c, d.*) Sie ist 1) einwärts gebogen, wenn sie vom Ansatze in einer Krümmung sich gegen die obere Spindellamelle wendet. — 2) Gerade, wenn sie gerade, ohne alle Einbiegung, in's Innere läuft. — 3) Abwärts gebogen, wenn sie von innen sich gegen die rechte Seitenwand wendet. — 4) Dem Ende der oberen Spindellamelle sich nähernd, wenn sie sich im Innern dem Ende der oberen Spindellamelle nähert. — 5) Vom Ende der oberen Spindellamelle sich entfernend, wenn zwischen ihr und dem Ende der oberen Lamelle ein deutlich sichtbarer Raum bleibt. — 6) Parallel, wenn sie mit der oberen Spindellamelle parallel fortschreitet.

4) Der Schild. (Fig. *A. i.*) Der Schild ist der Raum zwischen den beiden Spindellamellen und zwischen dem Canale, welcher da anfängt, wo im Inneren die beiden Lamellen mit einander parallel laufen. Er gibt blos das Gebilde und ist deswegen vom Canale getrennt. Das Bild selbst nimmt verschiedene Gestalten an und ist 1) Glockenförmig, wenn die beiden Spindellamellen eine Zeitlang von innen parallel heraus laufen, und sich dann weit von einander entfernen. — 2) Herzförmig, wenn das Gebilde ein Herz vorstellt. — 3) Herzähnlich, wenn nämlich dem Bilde des Herzens der Einschnitt fehlt, der durch einen scharfen Einbug der unteren Spindellamelle verursacht wird. — 4) Schnabelförmig, wenn der Schild sich vorne in eine Curve gegen auswärts endet, und einen stumpfen Sack, Schnabel oder eine Rinne bildet, wie bei der *Cl. rostrata.* — 5) Viereckig, wenn der Saum des Schildes und der Mundsaum rechter Hand mit den beiden Lamellen ein Viereck bilden u. s. w. — 6) Gross, wenn nämlich die beiden Spindellamellen sich weit von einander entfernen. — 7) Klein, im entgegengesetzten Falle.

5) Der Canal. (Fig. *A. k.*) Gewöhnlich laufen die beiden Spindellamellen von innen gegen aussen mit einander parallel, und der innere Raum zwischen diesen ist der Canal. Seiner Gestalt nach ist er 1) Enge, wenn die beiden Lamellen nahe aneinander liegen, oder wenn die untere Spindellamelle sehr erhaben ist, dass man den Canal nicht ganz sehen kann. — 2) Weit, wenn das Gegentheil eintritt. — 3) Gerade, wenn der Canal gerade hervorläuft. — 4) Aufsteigend, wenn der Canal sich links gegen die obere Spindellamelle zieht. — 5) Uebersehbar, wenn man den ganzen Canal in seiner gleichen Breite bis auf den Boden hinab übersehen kann. — 6) Tief und nicht tief, je nachdem die beiden Spindellamellen erhaben sind oder nicht. — 7) Lang oder kurz, je nachdem die beiden Lamellen lange oder nicht lange mit einander parallel laufen.

6) Der Saum des Schildes von vorne. (Fig. *A. l, l.*) Der Saum des Schildes ist diejenige scharfe Linie, welche den Schild von der Lippe oder (wenn die obere Spindellamelle bis zum Mundsaume hervorläuft), von dem Mundsaume trennt.

Da die obere Spindellamelle bei der *Cl. ventricosa* immer weit im Inneren an die Spindelwand angeheftet ist, und die Lippe bis zu diesem Ansatze reicht, letztere sich aber einwärts wölbet, so entstehet der Schild in einer Vertiefung und bildet da, wo er an die Lippe anstösst, seine Grenze; diese Grenze macht nun den vorderen Saum des Schildes aus. Der Saum läuft folglich vom Ansatzpuncte der oberen Spindellamelle in verschiedenen Richtungen herab bis zum Ansatze der Lamelle. Der Schildsaum läuft nach meinen bisherigen Erfahrungen: 1) Gerade *), d. h. er nimmt seinen Lauf vom besagten oberen Ansatze gegen die untere Lamelle: α. perpendiculär, β. schief einwärts, oder γ. schief auswärts gegen die Lippe. — 2) Geschweift, wie z. B. bei der herzförmigen Gestalt. — 3) Zum Theil geschweift und zum Theil gerade, z. B. bei meiner *Cl. vulnerata.* An dem Ansatze der oberen Lamelle befindet sich die Spitze des Herzens, von da schweift sich der Saum etwas heraus und fängt dann an, den Herzflügel zu runden, steht aber dann plötzlich stille und beschreibt, statt die Rundung dieses Herzflügels auszubilden, eine kurze gerade Linie bis zur unteren Spindellamelle. Auch bei der *Cl. radicans* ist dieses der Fall. — 3) Krumm auswärts gebogen, z. B. bei meiner *Cl. rostrata.* Bei dieser neigt sich der Saum etwas rundlich auswärts, und bildet gegen die untere Spindellamelle noch einen rundlichen Sack oder auch eine Rinne. Da ich nur die bekannte *Cl. ventricosa,* nicht aber alle

*) Diese gerade Linie bemerken wir bei meiner *Cl. quadrata,* auch manchmal bei der *Cl. infulaeformis* und bei der bekannten *Cl. biplicata;* sie ist aber bei keiner von diesen Clausilien an die angegebenen Neigungen α, β, γ, gebunden, und läuft bei jeder bald perpendiculär, bald ausbald einwärts. Das eigentliche Kennzeichen ist also blos die Geradheit des Saumes.

übrigen Clausilien untersucht habe, so können die Bildungen des Saumes und überhaupt die Gebilde noch sehr verschieden sein.

7) Das Schildchen *(clypeolus)*. (Fig. *A. m.*) Es ist der Raum zwischen der unteren Spindellamelle und der rechten Seitenwand. Das Schildchen hat folgende Formen: 1) Gross, wenn es von einer beträchtlichen Länge und Breite ist. — 2) Klein, im entgegengesetzten Falle. — 3) Lang, wenn es sich weit hinein zieht. — 4) Spitz, wenn es gegen innen spitz zuläuft, — 5) Vorne ist es meist eckig, rundlich, breit oder schmal.

Dieses Schildchen hat eben keinen festen Charakter, nur habe ich bemerkt, dass es sich bei der *Cl. quadrata* öfters der viereckigen Form nähert.

8) Die Lippe. (Fig. *A. n, n.*) Sie fängt am unteren Mundsaume an, begrenzt den vorderen Theil des Schildes, und reicht von der oberen Spindellamelle bis zur unteren.

9) Das Buchtchen. (Fig. *A. o.*) Es ist ein kleiner Einbruch an dem rechten Mundsaume, wo sich gewöhnlich dieser Mundsaum verdickt.

Das Buchtchen trägt oft bei, dass der Mundsaum bei'm Herüberdrehen die untere Spindellamelle frühe berührt, und hält also den Mundsaum ab, sich dem Ende oder der Seitenwand der oberen Lamelle zu nähern.

10) Die Hohlkehlen. (Fig. *A. p, p.*) Diese fangen da an, wo die beiden Seitenwände sich oben zu krümmen beginnen; am deutlichsten kommen sie bei der *Cl. bidens* vor.

11) Der Mundsaum von der rechten Seite. (Fig. *A. q, q.*) Dieser Saum spielt unter den unständigen Merkmalen die wichtigste Rolle, und ich hätte mich bald bewogen gefunden, ihn unter die ständigen Kennzeichen aufzunehmen, da er viel entscheidet; denn

erstens hängt die Gestalt der Bildung des Schildes viel von ihm ab, weil es darauf ankommt, ob er die untere Spindellamelle weit innen oder weiter gegen vorne hin berührt; und

zweitens entscheidet er sehr viel bei seiner Annäherung an- oder Entfernung von der oberen Spindellamelle; z.B. bei der *Cl. infulaeformis* ist er von der oberen Spindellamelle viel weiter entfernt, als bei der *Cl. cordata,* und bei der *Cl. rugosa* auffallend weit. Wenn bei zweifelhaften Exemplaren der rechte Mundsaum zerbrochen ist, bleibt auch die Entscheidung unsicher, und leichter ist diese, wenn der Mundsaum linker Hand einige Beschädigung erlitten hat.

12) Die Seitenlamellen. Sie kommen ganz im Hintergrunde vor und sind, meines Wissens, bisher noch wenig berücksichtigt worden. Nilson erwähnt ihrer bei der *Cl. bidens*. Es ist zu bedauern, dass dieser gründliche Naturforscher nicht mehr als drei Arten von Clausilien beschrieben hat. Ich theile diese Seitenlamellen in Ecklamellen und Hinterlamellen.

a) Die Ecklamellen sind hinter der oberen Spindellamelle sichtbar und ragen wie Zähne hervor.

Sie sind so zerbrechlich und hinfällig, dass ich sie nicht einmal unter den unständigen Merkmalen angeführt habe, denn ich habe sie schon im Wasser, worin ich nur lebende Clausilien zum Reinigen bewahrte, losgebrochen gefunden, und daher sehe ich keinen Grund, warum man auf ein so wankendes Merkmal bauen sollte.

b) Die zweite Art von Seitenlamellen zeigt sich an der inneren Seite (Hintergrunde). Diese erscheinen meistens aufwärts steigend, bald kurz, bald lang und von verschiedener Zahl. Sie sind bei einer und derselben Art nicht immer gleich, und dienen daher zu keiner Bestimmung; ihr Zweck scheint zu sein, die Wände desto mehr zu befestigen, und ich glaube auch, dass sie dazu dienen, dass das Thier einen oder mehrere Haltungspuncte habe, um das Haus mit mehr

Bequemlichkeit mitschleppen zu können. — Wenn man diese hinteren Seitenlamellen von der Rückseite gegen das Licht betrachtet, scheinen sie durch. Rechter Hand erblickt man das Clausilium, gewöhnlich in Gestalt einer Sichel. Diese Sichel ist entweder rund gebogen oder läuft vom Stiele an nur nachlässig sich krümmend gegen den Nabel hin. Neben der Sichel liegen auf dem Rücken die Seitenlamellen, welche ich mit dem Namen „Stäbe" belege.

Es sind daher auf der Rückseite zu betrachten:

1) Die Sichel, welche ich vorher schon beschrieben habe. Hiebei bemerke ich, dass der Stiel der Sichel oft fast gerade, oft schief herabläuft.

2) Der Unterstab. Er läuft oft mit der Naht parallel, und steigt links ein wenig aufwärts. Das entgegengesetzte Ende dieses Stabes reicht oft kaum bis unter die Sichel, manchmal aber gehet er um 2 bis 4 Furchen (Streifen) über die Sichel hinaus.

3) Der mittlere Stab. Er stehet schief auf dem Felde (Rückseite), sich gegen die Sichel neigend, welcher er sich bald mehr, bald weniger nähert, ja sie sogar manchmal berührt.

4) Der Oberstab, welcher wieder höher steht; und

5) der perpendiculäre Stab. Er läuft kurz oder lang perpendiculär herab gegen den Oberstab.

Nun ist noch zu bemerken, dass diese Stäbe zu vier an der Zahl nur selten erscheinen. — Die Seitenlamellen des Hintergrundes sind auf der Fig. *A*. *R, R, R* angezeigt.

Aus dem, was ich bisher angeführt habe, bleibt kein Zweifel übrig, welches an der *Cl. ventricosa* (die übrigen sind schon bestimmt) die ständigen Kennzeichen sind; nämlich:

α. der vordere Saum des Schildes;

β. der Schild, und

γ. der Canal.

Die oberen und unteren Seitenlamellen tragen nicht immer die Merkmale der Ständigkeit an sich, z.B. den Höcker, die Färbung, die Erhabenheit u.s.w., denn diese ändern mit dem Alter ganz auffallend; ich musste sie aber doch neben den ständigen mit aufnehmen, weil ihre Basen den Schild und den Canal bilden, welche ständig zu nennen sind, und wenn auch der Schild eine kleine Abänderung leidet, wird das geübte Auge ihn leicht erkennen, und von den Uebrigen ohne Schwierigkeit zu unterscheiden wissen.

Es gibt Kupferstiche, welche Bäume vorstellen. Die Stämme oder Zweige dieser Bäume sind künstlich so gebogen, dass zwischen ihnen ein Porträt vorgestellt wird. Man kann dieses Porträt oder Silhouet leicht übersehen, selbst wenn man darauf aufmerksam gemacht wird; hat man aber einmal das Profil gefunden und ist das Auge einmal durch den öfteren Anblick daran gewöhnt, so wird man das Bild immer auf der Stelle finden, wenn man sich auch Mühe gäbe, die Zweige und die Stämme in Gedanken zu verwirren.

So ist es auch hier der Fall.

§ 3.

Von der Zubereitung zur Beobachtung der Clausilien.

Ich glaube eine kleine Anweisung zu den Handgriffen vorausschicken zu müssen, welche bei der Beobachtung der Clausilien nicht ausser Acht gelassen werden dürfen und denke, dass die beigefügte Figur *A.* diese Beobachtung erläutern werde.

Will man eine *Cl. ventricosa* mit den auf der Tafel befindlichen vergleichen, so halte man erstere so, dass die Spindelspitze abwärts stehe, wie schon die Zeichnung selbst an die Hand gibt; folglich wird das, was Pfeifer mit Recht oben nennt, unten, und was er unten nennt, wird oben zu stehen kommen.

Man versehe sich ferner mit einer guten Loupe, welche man so hält, dass der Mittelpunct des Glases gerade gegen den Anfang der unteren Spindellamelle zu gerichtet ist, während man die Clausilie so vor sich hält, dass man die ganze Mündung derselben übersehen kann. Wenn man nun mit dem Glase den Anfang der unteren Spindellamelle fest in's Auge gefasst hat, drehe man die Clausilie weiter links bis auf den Punct herüber, wo der rechter Hand befindliche Mundsaum die untere Spindellamelle zuerst berührt, welches bei *e, f, g* oder *h* geschehen kann.

Wenn nun der Mundsaum auf diesem Berührungspuncte festgehalten wird, so erblickt man linker Hand zwischen den beiden Haupt-Lamellen den eigentlichen Schild *(i)*, welcher nach Figur *A* auf der beigefügten Tafel verschiedene Formen annimmt.

Anfangs findet man das Bild *i* nicht gleich, wenn man aber das Auge einmal daran gewöhnt hat, darf man sich, wie ich schon erinnerte, Mühe geben, es nicht zu sehen, und doch wird diese Mühe vergeblich sein.

Das angeführte Bild Fig. *A.* zeigt uns den grossen Schild *i* von der *Cl. cordata,* und dieser ist herzförmig, so dass das Herz verkehrt auf der unteren Lamelle steht, und die Spitze des Herzens oben bei'm Ansatze der oberen Lamelle ersichtlich ist; bei *s* befindet sich der Einschnitt des Herzens, welcher durch den starken Einbug der unteren Lamelle verursacht wird.

Da nun auf der unteren Lamelle von *c* bis *d* viele Puncte denkbar sind, welche der Mundsaum rechter Hand zuerst berühren kann, so muss der Schild bei jeder Bewegung gegen *e, f, g* oder *h* ebenfalls weiter zurückgedreht werden und auf diese Art werden die Gebilde durch die Verstärkung oder Milderung des Lichtes deutlich.

Es wäre eigentlich nicht nöthig, sich sehr genau an das Drehen des rechten Mundsaumes zu halten, denn das Bild erscheint doch;

aber man kann dann nicht beurtheilen, ob der Mundsaum dem inneren Ende der oberen Spindellamelle sich nähert, oder sich von ihm entfernt, was doch bei Untersuchung der *Cl. cordata* und *Cl. infulaeformis* zu wissen nothwendig ist; indem der Mundsaum bei der *Cl. cordata* der oberen Spindellamelle viel näher tritt, als bei der *Cl. infulaeformis*.

§ 4.
Classification der *Clausilia ventricosa* nach ihren verschiedenen Gebilden.

Da, wo die Gebilde so verschieden sind, und die Unterscheidungs-Merkmale in jeder besonderen Art sich wieder finden, kann gewiss eine Classification statt haben, ja, sie ist nach der gewöhnlichen Denkungsart der Naturforscher sogar nothwendig, theils um die Begriffe einer Art gehörig zu ordnen und theils um das Auffinden selbst zu erleichtern.

Nach den Grundsätzen, welche ich in der Terminologie aufgestellt habe, ist bei dieser Art von Mollusken nur der Schild, der sich zwischen den beiden Hauptlamellen bildet, der entscheidende Theil, und nach diesem soll auch die Classification geschehen, wie folgt:

I. Classe.

Die *Clausilia ventricosa* mit zwei Spindellamellen.

I. Ordnung.

Der Schild herzförmig, wie z. B. bei der *Clausilia cordata* und *Cl. vulnerata*.

II. Ordnung.

Der Schild herzähnlich, z. B. bei der *Clausilia infulaeformis* und *Cl. radicans*.

III. Ordnung.

Ohne herzähnlichen Schild, z. B. bei *Clausilia rostrata* und *Cl. quadrata*.

II. Classe.

Die *Cl. ventricosa* mit mehreren Spindellamellen. *Cl. plicatula.*

III. Classe.

Die *Clausilia ventricosa* mit mehreren Lamellen auf der Lippe.

Diese beiden letzteren Arten der II. und III. Classe sind zwar schon längst bestimmt, weil sie aber von Einigen zur *Clausilia ventricosa* gerechnet werden wollen, habe ich sie hier mit angeführt.

Bei einer unparteiischen Vergleichung dieser beiden letzteren Clausilien wird sich jedoch ein bedeutender Unterschied zeigen, und meine Ansicht über die Merkmale, welche zu entscheiden haben, wird sich hinlänglich rechtfertigen.

Die Eintheilung der Clausilien in Classen und Ordnungen mag wohl hier eine Rüge verdienen; ich habe aber bei der Bearbeitung nicht die gesammten Mollusken, sondern blos diese Art vor mir gehabt. Wenn sie nun von allen Zweifeln gereiniget sind, und in das grosse System eingereiht werden können, mag Jeder sie nach Umständen dahin setzen, wohin sie ihrer Natur nach gehören.

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§ 5.

Beschreibung der verschiedenen Gebilde der *Clausilia ventricosa.*

I. Classe.

Mit zwei Lamellen auf der Spindel.

I. Ordnung.

Mit einem herzförmigen Schilde.

1. *Clausilia cordata.* Fig. I.

Ständige Kennzeichen.

Obere Spindellamelle weit zurück vom Rande der Spindelwand angesetzt; die Leiste mit einer sanften Einbiegung gegen die

Basis, etwas schief nach einwärts laufend, erhaben, die innere Seite *a, b* des Herzens bildend. Untere Spindellamelle vom unteren Spindelrande an mit kurzer aber scharfer Einbiegung nach oben aufwärts steigend, und sich gegen innen der oberen Lamelle sehr nähernd. Der höchste Punct, den diese Lamelle bei'm Einbuge *s* erreicht, bildet den Einschnitt des Herzens, welches verkehrt auf dieser Lamelle ruht. Vorderer Raum des Schildes vom Ansatze der oberen Spindellamelle herab geschweift, so, dass er gleichsam das Contour der einen Hälfte des Herzens darstellt. Der Schild ein vollkommenes Herz bildend. Der Canal einwärts verengt.

Unständige Merkmale.

Länge 6–8¼‴. Breite 1⅛–2‴. Oberer Mundsaum mit auswärts gehendem scharfem Winkel. Der Mundsaum von der rechten Seite der oberen Lamelle sich sehr nähernd. Die Schale hellbraun, gelblich, durchscheinend, bauchig und auch schlank. Seitenlamellen. Umgänge 10½–12½‴; die Streifung nicht sonderlich tief, jene des letzten Umganges tiefer. Schildchen nach aussen eiförmig, nach innen spitz, oft etwas winklig. Naht ziemlich tief. Mündung oval-birnförmig, schmal zusammengedrückt und breit, weiss, etwas zurückgebogen. Nabelritze tief. Rückenwulst erhaben.

2. *Clausilia vulnerata.* Fig. II.

Ständige Kennzeichen.

Obere Spindellamelle weit zurück vom Rande der Spindelwand angesetzt, etwas schief nach einwärts laufend, erhaben, die innere Seite des Schildes bildend. Untere Spindellamelle vom unteren Spindelrande bogenförmig sich einwärts ziehend, ohne scharfen Einbug, oft auch mit einem scharfen Einbuge, in welchem Falle sich ein Herz bildet. Vorderer Saum des Schildes. Er besteht aus zwei Theilen: 1) aus einer Linie, die entweder zum Theile in

gerader Richtung eine Zeitlang von oben auswärts läuft, und dann sich an eine fast horizontale Linie anschliesst, oder geschweift von der Spitze des Herzens herabläuft, sich an eine kurze horizontale Linie anschliessend; 2) aus einer kleinen Horizontallinie, den Schild oder das Herz zerschneidend *(vulnerans)*, wie durch die Puncte *a, b* angezeigt ist. *) Der Schild ein vollkommenes Herz bildend, wenn die untere Lamelle einen scharfen Einbug hat; ohne diesen verschmilzt der innere Saum des Schildes mit dem Canale. Der Canal einwärts verengt, wenn, dem oben Gesagten zufolge, die untere Lamelle scharf einwärts gebogen ist, oder erweitert, wenn diese einen Bogen ohne scharfen Einschnitt bildet.

Unständige Merkmale.

Länge 6¾–9‴. Breite 1¾–2¼‴. Oberer Mundsaum mit auswärts gehendem scharfem Winkel. Der Mundsaum von der rechten Seite, wenn der Schild herzförmig ist, der oberen Spindellamelle sich sehr nähernd, oft sie berührend; ist der Schild mit dem Canale verschmolzen, etwas von der oberen Spindellamelle sich entfernend. Die Schale braun, hellbraun, durchscheinend, bauchig und schlank. Seitenlamellen. Umgänge 11–12½. Die Streifung nicht sonderlich tief. Schildchen birnförmig, eckig, nicht immer gleich. Naht tief, oft etwas seichter. Mündung oval-birnförmig, schmal zusammengedrückt und breit, weiss, etwas zurückgebogen. Nabelritze tief. Rückenwulst erhaben.

Unterscheidungs-Kennzeichen. Sie ist leicht zu unterscheiden, da sie immer unten gegen den Ansatz der unteren Spindellamelle eine kurze horizontale Linie hat, womit die *Cl. cordata* nicht versehen ist.

*) Hat die untere Lamelle den scharfen, den Einschnitt des Herzens bildenden Einbug, so nähert sich die untere Spindellamelle sehr der oberen; bildet sie aber nur einen Bogen, so ist diese Annäherung nicht so stark.

II. Ordnung.

Mit zwei Lamellen auf der Spindel.

A. Mit herzähnlichem Schilde.

3. *Clausilia infulaeformis.* Fig. III.

Ständige Kennzeichen.

Obere Spindellamelle weit zurück am Rande der Spindelwand angesetzt, die Leiste mit einer Einbiegung gegen die Basis schief einwärts laufend, erhaben. Untere Spindellamelle nicht erhaben, vom unteren Spindelrande an in einem Bogen laufend und innen sich mehr gegen die rechte Seitenwand neigend, und von der oberen Spindellamelle sich entfernend. Vorderer Saum des Schildes etwas geschweift, fast wie bei *Cl. cordata.* Der Schild herzähnlich, nur fehlt ihm der tiefe Einschnitt des Herzens; oft ist der Schild auch dreiseitig. *) Der Canal weit, fast ganz sichtbar.

Unständige Merkmale.

Länge 7–8¼‴. Breite 1¾–2¼‴. Oberer Mundsaum mit auswärts gehendem scharfem Winkel. Der Mundsaum auf der rechten Seite von der oberen Lamelle sich ziemlich entfernend, über dem Buchtchen gegen die Hohlkehle ausgebogen. Die Schale mehr oder minder braun. Seitenlamellen. Umgänge 11½–12½, nicht sehr tief gestreift. Schildchen oval, vorne eckig. Naht nicht tief. Mündung oval. Nabelritze tief. Rückenwulst erhaben.

Unterscheidungs-Kennzeichen. Sie unterscheidet sich auffallend von der *Cl. cordata* durch einen weiten Canal, und von der *Cl. vulnerata* ebenfalls durch den weiteren Canal und durch den Mangel der kleinen horizontalen, den Schnitt *(vulnus)* verursachenden

*) Ich wollte diese *triangularis* nennen; um aber nicht zu vielerlei Gebilde hervorzubringen, rechnete ich sie zur *Cl. infulaeformis.*

Linie, und endlich durch den rechten Mundsaum, der von der oberen Lamelle viel weiter absteht, als bei der *Cl. cordata.*

4. *Clausilia radicans.* Fig. IV.

Ständige Kennzeichen.

Obere Spindellamelle wenig erhaben, weit vom Rande an der Spindelwand zurück angesetzt, nicht so tief, wie jene der *Cl. infulaeformis* herabgesenkt; auf der Lippe wurzelnd*) *(radicans).* Untere Spindellamelle erhaben, vom Spindelsaum an nur wenig einwärts gebogen, sich in's Innere ziehend, von der oberen Lamelle sich entfernend. Vorderer Saum des Schildes, wie bei der *Cl. vulnerata,* sich an eine horizontale Linie anschliessend, welche dann bis zur unteren Spindellamelle fast gerade hinläuft. Schild herzähnlich, sich in den Canal verlierend. Canal sehr weit, ganz sichtbar.

Unständige Merkmale.

Länge 7–8¼‴. Breite 1¾–2¼‴. Oberer Mundsaum mit auswärts gehendem scharfem Winkel. Der Mundsaum von der rechten Seite der oberen Lamelle sich ziemlich nähernd. Die Schale dunkelbraun, hellbraun, weisslich, gelblich, bauchig. Seitenlamellen. Die Umgänge mit etwas tiefer Streifung. Schildchen birnförmig. Naht tief. Mündung oval. Nabelritze tief. Rückenwulst erhaben.

Unterscheidungs-Kennzeichen. Von der *Cl. cordata:* diese bildet ein förmliches Herz und hat keinen weiten Canal; auch hat sie den Herzeinschnitt. Von der *Cl. vulnerata:* die *radicans* hat zwar auch eine Wunde, aber die *vulnerata* hat keine Wurzeln, die *radicans* aber einen weiteren Canal.

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*) Die Wurzel ist einfach oder doppelt. Die *Cl. quadrata* hat wohl auch oft eine oder zwei Wurzeln, aber ihr fehlt die kleine Querlinie *(vulnus).*

III. Ordnung.

B. Ohne herzähnlichen Schild.

5. *Clausilia rostrata.* Fig. V.

Ständige Kennzeichen.

Obere Spindellamelle erhaben, etwas abwärts geneigt, weit vom Rande an der Spindelwand angesetzt, manchmal mit Wurzeln versehen. Untere Spindellamelle erhaben; vom Spindelrande an, wo sie einwärts eine scharfe Schneide oder Spitze bildet, einwärts laufend. Vorderer Saum des Schildes läuft rund herab, auswärts gegen die Lippen gebogen, und bildet unten bei dem Ansatze der unteren Lamelle einen stumpfen Haken oder eine kleine Rinne, oder eine Spitze. Schild lang, vorn hakenförmig, oder auch rinnenförmig. Canal: die beiden Lamellen laufen von innen fast parallel mit einander hervor und erweitern sich nur allmälig gegen vorne.

Unständige Merkmale.

Länge 6¼–9‴. Breite 2–2½‴. Oberer Mundsaum mit auswärts gehendem scharfem Winkel. Der Mundsaum von der rechten Seite der oberen Lamelle sich nähernd. Die Schale dunkelbraun, hellbraun in's Röthliche, gelblich. Seitenlamellen zwei und drei, im letzteren Falle die mittlere am längsten. Umgänge 11½–14, stark gestreift, oben tiefer. Schildchen ziemlich gross, vorne eckig, gegen innen spitz. Naht nicht sonderlich tief. Mündung oval, weiss, auch matt-braun im frischen Zustande. Nabelritze tief. Rückenwulst erhaben.

Unterscheidungs-Kennzeichen. Von allen Vorstehenden ist sie dadurch verschieden, dass sie keinen herzähnlichen Schild hat, sondern der Schild nur die Fortsetzung des Canals ist.

6. *Clausilia quadrata.* Fig. VI.

Ständige Kennzeichen.

Obere Spindellamelle erhaben, weit vom Rande der Spindelwand zurückgesetzt, nur wenig sich abwärts senkend, oft zwei Wurzeln habend. Untere Spindellamelle vom Spindelrande an wenig eingebogen, fast gerade einwärts laufend, von der oberen Lamelle ziemlich gleichweit entfernt bleibend, wenig erhaben. Vorderer Saum des Schildes von oben perpendiculär auf die untere Lamelle herablaufend, oder gegen unten sich ein wenig auswärts neigend. Schild länglich-viereckig; drehet man den rechten Mundsaum weiter links, dass er die obere Spindellamelle von innen bedeckt, so entsteht ein reguläres oder schiefes Viereck. Die Fig. VI. zeigt das Nähere. Canal parallel bis zum geraden Saum des Schildes hervorlaufend, weit, ganz sichtbar.

Unständige Merkmale.

Länge $6\frac{3}{4}$–$9'''$. Breite $1\frac{3}{4}$–$2'''$. Oberer Mundsaum mit auswärts gehendem scharfem Winkel. Der Mundsaum von der rechten Seite sich der oberen Spindellamelle nähernd. Schale dunkel- und hellbraun, gelblich. Seitenlamellen 1–2–$2\frac{1}{2}$. Umgänge 12. Schildchen meistens sich dem Vierecke nähernd. Naht ziemlich tief. Mündung oval, weiss, bräunlich. Nabelritze tief. Rückenwulst erhaben.

Unterscheidungs-Kennzeichen. Unterscheidet sich von der *Cl. rostrata* durch den geraden Schildsaum und durch das Quadrat des Schildes; denn da der Schildsaum gebogen ist, kann die vordere vierte Linie der *Cl. rostrata* den Schild nicht viereckig bilden.

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*

II. Classe.

Mehrere Spindel-Lamellen.

I. Ordnung.

1. Clausilia plicatula. Fig. VII.

Ständige Kennzeichen.

Obere Spindellamelle *) doppelt, an der Seite der Spindelwand tief innen angesetzt, beide gegen aussen vereinigt, dann unbestimmt divergirend. Die beiden Lamellen etwas weit oben gegen die Hohlkehle an der Seitenwand der Spindel angeheftet; die obere Lamelle läuft etwas schief herab gegen den inneren Theil der untersten Spindellamelle, oft von innen den Canal schliessend, oft etwas mehr gerade einwärts, immer sehr erhaben. Im frischen Zustande ganz röthlich-braun, oder nur mit dieser Farbe eingefasst. Untere Spindellamelle ziemlich erhaben, vom Spindelrande an sich wenig einwärts biegend, innen sich der obersten Lamelle nähernd, auch wohl sich im Inneren entfernend. Vorderer Saum des Schildes: wo die beiden oberen Lamellen sich auf einem Puncte vereinigen, bildet der Schild ein spitzes Eck, und der Saum des Schildes wird durch die zweite obere Lamelle unterbrochen, beschreibt unter dieser Lamelle einen rundlichen Bogen herauswärts, sich dann etwas mehr gerade gegen den Ansatz der unteren Lamelle neigend. **) Der Schild bildet, die zweite Lamelle neben der oberen weggedacht, bei frischen Exemplaren eine grosse herzähnliche Figur; er ist mit mehreren La-

*) Ich habe schon früher gesagt, dass ich die obere und untere Spindel-Lamelle nicht für ständige Kennzeichen halte, sondern sie nur des Schildes und dessen Saumes wegen nicht von den ständigen Kennzeichen trennen wollte.

**) Bei älteren oder verwitterten Exemplaren ist das Eck vorn am Ansatze der Spindellamelle nicht mehr vorhanden, weil auch die zweite obere Lamelle nicht mehr sichtbar ist. Dann läuft der Schildsaum rundlich auswärts gebogen herab.

mellen versehen. Canal weit, ganz übersehbar, von innen gegen die Spindelwand aufwärts steigend.

Unständige Merkmale.

Länge $6\frac{1}{2}-7\frac{1}{2}'''$. Breite $1\frac{3}{4}-2'''$. Oberer Mundsaum ohne Winkel. Der Mundsaum auf der rechten Seite von der oberen Lamelle sich entfernend. Schale dunkel, hellbraun, weisslich, gelblich, bauchig, schlank, nach der Quere fein gestreift, in älteren Exemplaren diese Streifen verwischt; standhaft kleiner als die *Cl. biplicata.* Seitenlamellen: eine. Umgänge 10-11, fein gestreift. Schildchen lang, gegen innen spitz. Naht sehr tief. Mündung fast rund. Nabelritze tief. Rückenwulst erhaben.

Unterscheidungs-Kennzeichen. Sie ist von allen übrigen Clausilien sehr verschieden, und zwar durch den grossen Schild, durch den Schildsaum, durch die beiden oberen Lamellen, durch die gegitterte Streifung, und durch die vielen Lamellen auf dem Schilde.

III. Classe.

Mehrere Lamellen auf der Lippe.

I. Ordnung.

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8. ***Clausilia biplicata.*** Fig. VIII.

Ständige Kennzeichen.

Obere Spindellamelle nicht sehr erhaben. Vom Rande der Spindelwand zurückgesetzt, gegen innen sich ein wenig abwärts neigend. Untere Spindellamelle vom Mundsaum sich einwärts biegend, mit der oberen Lamelle lange von innen gegen vorne parallel laufend und vorn sich allmälig von ihr entfernend. Vorderer Saum des Schildes gerade, unten ein- oder auswärts geneigt. Schild canalförmig und mit dem Canale selbst verschmolzen, oder, was dasselbe

ist: der Schild bildet zugleich den länglich-viereckigen Canal. Auf der Lippe mit mehreren kleinen gegen den Schild gekehrten Lamellen geziert. Drehet man den rechten Mundsaum so herüber, dass von ihm die obere Spindellamelle ganz innen berührt wird, so bildet sich ein Quadrat. Canal weit, ganz übersehbar, lange von innen gegen aussen sich erweiternd.

Unständige Merkmale.

Länge 7–8¾‴. Breite 1¾–2¼‴. Oberer Mundsaum mit auswärts gehendem scharfem Winkel. Mundsaum von der rechten Seite der oberen Lamelle sich ziemlich nähernd. Schale braun, gelblich, bauchig, schlank, mehr oder minder tief gestreift. Seitenlamellen 2–3. Umgänge 12–12½. Schildchen eckig, oft dem Vierecke sich nähernd. Naht tief. Mündung oval-birnförmig, zusammengedrückt, weiss. Nabelritze sehr tief. Rückenwulst erhaben.

Unterscheidungs-Merkmale. Sie unterscheidet sich von allen Uebrigen durch die auf der Lippe liegenden Lamellen; der Schild, und oft auch das Schildchen, nähern sich der *Cl. quadrata*. Von der *Cl. plicatula* ist sie verschieden durch die Lippenlamellen, welche bei der ersteren auf dem Schilde liegen, durch die einfache obere Spindellamelle, durch die Mündung, welche bei der *Cl. biplicata* immer oval- oder birnförmig ist, durch den Winkel am oberen Mundsaum, welcher der *Cl. plicatula* immer fehlt und endlich dadurch, dass die *Cl. plicatula* immer kleiner erscheint; vorzüglich ist noch zu bemerken, dass der Schild der *Cl. biplicata* viereckig ist, bei der *Cl. plicatula* aber herzähnlich erscheint.

Ich habe nun die Verschiedenheit der Gebilde der bisher bekannten *Clausilia ventricosa* bis zur Gewissheit bewiesen und gezeigt, dass diese Abänderungen ständig sind, ständiger, als alle bisher angegebenen, blos an der äusseren Schale bemerkbaren Kennzeichen, während

ich diese Kennzeichen an einem weit edleren Theile, als an der Schale, von aussen gefunden habe.

Wer die Clausilien in ihrer Jugend betrachtet hat, wird gefunden haben, dass sie Anfangs in der Mündung mit gar keinen Lamellen versehen sind und dass diese, wenn sie sich einmal zu bilden anfangen, für immer in ihrer Lage bleiben. Es lässt sich also der Schluss ziehen, dass die verschiedenen Gebilde der *Cl. ventricosa* keine Uebergänge sein können, weil die Beobachtungen an schon ausgebildeten Exemplaren gemacht wurden.

Bei der gegenwärtigen wankenden Bestimmungsart und den bisherigen Anhaltspuncten kann man unmöglich Familien von Familien trennen, denn der Familien-Charakter kann nicht in äusseren zufälligen Formen liegen. Daher kommt es, dass bei dem Clausilien-Geschlechte überhaupt alle Formen des Schildes durcheinander geworfen sind, und ein eigentliches System gänzlich mangelt.

Ich will nun einen kleinen Versuch machen, das Gesagte noch mehr zu bestätigen, und führe nur noch zwei schon bestimmte Arten, die *Cl. rugosa* und *Cl. minima* an, wovon ich das Gebilde der ersteren noch in der Zeichnung vorlege, und zwar aus der

II. Classe.

Mit mehreren Spindel-Lamellen.

9. *Clausilia rugosa.* *) Fig. IX.

Ständige Kennzeichen.

Zwei obere Spindellamellen. Beide weit innen an der Spindelwand angeheftet, gegen innen divergirend; im frischen Zustande vorn an der Spindelwand durch eine kurze Querleiste verbunden, und die oberste auf der Leiste einen kleinen Höcker

*) Auch diese Clausilie wurde unter dem Namen: *Cl. ventricosa* als altes Exemplar hieher gesendet.

tragend; über diesem Höcker ist der Eindruck des Nabels stark sichtbar. Die oberste Lamelle erhaben, stark ausgeschweift, sich gegen innen bogenförmig endigend. Die zweite Lamelle niedriger, gegen die untere Spindellamelle sich neigend, oft bogenförmig, oft gerade fortlaufend und spitz sich endigend. Untere Spindellamelle ganz sanft einwärts gebogen, dann bis in den Hintergrund einen starken Haken bildend, ganz sichtbar bis zum Schlunde. Vorderer Saum des Schildes gegen auswärts sich sanft herab biegend, oft mehr gerade laufend. Schild gross, die mittlere Lamelle abgerechnet oder weggedacht, herzähnlich, gegen die Spindelwand zu gebogen. Canal sehr weit, von innen heraus aufwärts steigend.

Unständige Merkmale.

Länge $6\frac{3}{4}-8\frac{3}{4}'''$. Breite $2'''$. Oberer Mundsaum ohne Winkel, aber die Lichte einen solchen andeutend, oben zwischen den zwei Wülsten eine Vertiefung, wie eine Lamelle, sich zeigend; an der rechten Seitenwand, gleich über dem Buchtchen, eine Erhöhung, braun gefärbt. Der Mundsaum rechts weit von der oberen Spindellamelle abstehend. Schale bauchig, schlank, dunkelbraun, etwas glänzend. Seitenlamellen: eine. Umgänge 10–$10\frac{1}{2}$, in die Länge und Breite fein gestreift. Naht tief. Mündung oval. Nabelritze tief. Rückenwulst sehr erhaben.

10. *Clausilia minima.*

Ständige Kennzeichen.

Obere Spindellamelle nicht sehr erhaben, weit innen an der Spindelwand angesetzt, ausgeschweift. Untere Spindellamelle unmerklich einwärts gebogen, sich innen in einen starken Haken endigend, ganz sichtbar bis zum Schlunde. Vorderer Saum des Schildes vom Puncte, wo die obere Lamelle an die Spindelwand angeheftet ist, schief abwärts an die Lippe hervorlaufend, dann vermittelst eines stumpfen Winkels sich bis zum Ansatze der unteren

Spindellamelle herabsenkend. Schild verhältnissmässig gross, oft ein vollkommenes Herz bildend, mit grossen Seitenflügeln; auf der Mitte des Schildes eine schmale Lamelle sich einwärts ziehend. Canal weit, sich etwas aufwärts neigend.

Unständige Merkmale.

Länge $3\frac{1}{4}-4\frac{1}{4}'''$. Breite $1-1\frac{1}{4}'''$. Oberer Mundsaum: ein Winkel kaum bemerkbar; an der rechten Seitenwand, gleich oberhalb des Buchtchens, eine Erhöhung braun gefärbt; oben zwischen den zwei Wülsten eine Vertiefung, wie eine Lamelle sich zeigend. Mundsaum rechts weit von der oberen Lamelle sich entfernend. Schale bauchig, schlank, schwarz, weisslich, dunkelbraun, grün, gelb, glänzend. Seitenlamellen. Umgänge 8–10, nach der Länge und Quere sehr fein gestreift. Schildchen sehr lang gezogen, vorn oval, von innen spitz. Naht ziemlich tief. Mündung oval, weiss. Nabelritze sehr tief. Rückenwulst sehr erhaben.

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§ 6. Betrachtungen.

Aus der Beschreibung der *Cl. biplicata* hat sich zwischen ihr und der *Cl. plicatula* ein sehr bedeutender Unterschied ergeben; sie sind nicht im Geringsten mit einander verwandt. Die obere Lamelle der *Cl. plicatula* hat noch eine zweite obere Lamelle als Gefährtin, und nähert sich der *Cl. rugosa,* und wenn gleich die *Cl. minima* nicht zwei divergirende Lamellen an der Spindelwand hat, so hat sie doch längs dem Schilde eine kleine Lamelle. Der Schild ist bei allen dreien ziemlich ähnlich, und besonders bei den letzteren beiden treffen sogar mehrere unständige Merkmale zusammen, z. B. die einer Lamelle ähnliche Vertiefung oben hinter dem Mundsaume, die braune Erhabenheit an der rechten Seitenwand und die doppelte Streifung.

Dieses ziemliche Uebereinkommen von Merkmalen dürfte uns unmaassgeblich auf den Weg führen, wie die Clausilien zu ordnen

wären; denn bisher wird schwerlich ein anderes System beobachtet worden sein, als das des vortrefflichen Pfeiffer. Er theilt sie nach dem Peristom ein: α. ***Peristomate non continuo,*** und

β. ***Peristomate continuo.***

Bei den Clausilien mit dem ***Peristomate continuo*** folgen aber noch 15 Arten, von denen ich nicht weiss, nach welcher Ordnung sie gereiht sind. Wenn man die glockenförmigen, die herzförmigen und herzähnlichen, die viereckigen, die canalartigen, und wie die Schilde alle heissen, zusammenstellen würde, wäre nicht nur allein mehr Ordnung im System, sondern es würde auch das Aufsuchen ausserordentlich erleichtert werden, wofür besonders der Anfänger grossen Dank wissen dürfte. Ich setze nun den Fall, ein solcher Anfänger habe ein paar Hunderte von Clausilien aufgefunden, worunter auch die ***Cl. minima*** befindlich ist, die er aber alle nicht kennt. Zufällig will er die ***Cl. minima,*** und zwar zuerst untersuchen: weil aber in der Diagnose ihr die Dickbauchigkeit als Kennzeichen beigelegt ist, hält er sie gewiss nicht für diese Art und sucht andere, welche grösser und mehr bauchig sind.

Nach der vorn angegebenen Classification wird er sie unter der II. Classe suchen, wo auch das Maass 3¼ bis 4¼‴ Länge angegeben ist, wonach er erst das relativ Bauchige begreifen wird, und er sie leichter findet, als wenn er sie erst aus Hunderten heraussuchen muss.

Ich finde es nicht für nothwendig, noch mehrere Clausilien zu beschreiben, um zu beweisen, dass jede schon bestimmte Art hinsichtlich des vorderen Mundsaumes, des Schildes und des Canals sich ähnlich ist; denn davon kann sich nur Jeder selbst überzeugen, und ich würde dadurch zur weiteren Aufklärung nichts mehr beitragen.

Es bleibt mir also nichts übrig, als der Wunsch, dass gegenwärtige kleine Abhandlung zur Belohnung meines Strebens nach Belehrung von Kennern gütig aufgenommen werden möchte.

Fig. I.

Fig. III.

Fig. VI.

Fig. II.

Fig. IV.

Fig. III.

Fig. VIII.

Fig. VII.

Fig. V.

Fig. IX.

Lit. A.

UEBER

DIE BYSSUS DES MYTILUS EDULIS

VON

TYCHO TULLBERG.

MIT EINER TAFEL.

(Mitgetheilt der Königl. Gesellschaft der Wissenschaften zu Upsala am 19 Juli 1877).

UPSALA 1877,
DRUCK DER AKADEMISCHEN BUCHDRUCKEREI,
ED. BERLING.

Ueber die Entstehung und Entwickelung der merkwürdigen Bildung bei gewissen Muscheln, die Byssus genannt wird, finden sich eigenthümlich genug nur wenige Aufsätse. Der wichtigste von diesen ist ohne Zweifel derjenige A. Müllers »Ueber die Byssus der Acephalen»[1]). In dieser Abhandlung spricht Müller die Ansicht aus, dass die Byssus der Muscheln aus zwei Arten Substanz, »der Byssusmaterie und der Verbindungsmaterie» bestehe, wovon die erstere in einer besonderen Drüse, »der Byssusdrüse», und die letztere in der Höhle, worin die Byssus selbst befestigt sitzt, »der Byssushöhle», gebildet werden. Die Byssusdrüse liegt nach der Meinung Müllers im Fusse[2]) zu beiden Seiten der auf der unteren Seite des Fusses befindlichen Rinne. An ihrem äusseren Ende liegt eine Querspalte, worin Müller hat beim Mytilus sieben Oeffnungen für die Ausführungsgänge der Byssusdrüse zu finden geglaubt. Die Byssusmaterie macht nach der Meinung Müllers die Hauptmasse der Byssus aus, und die Verbindungsmaterie dient nur dazu diese am Thiere zu befestigen. Dies geschieht bei verschiedenen Arten auf verschiedene Weise: »entweder hüllt die Verbindungsmaterie die Byssusmaterie ein, oder sie wird von ihr eingeschlossen. Im letzteren Falle herrscht bei der Byssusmaterie die Ausdehnung in die Fläche vor, sie schlägt sich um die Verbindungsmaterie herum und bildet eine Art Rinde, die ein Gemisch von Byssus- und Verbindungsmaterie einschliesst. . . . . Im ersten Falle herrscht in der Byssusmaterie die Fadenform vor, die Ver-

[1]) Archiv für Naturgeschichte, Jahrg. III, B. 1 Berlin 1837.

[2]) Ich bediene mich dieses Ausdruckes in derselben Bemerkung wie Müller »den zungenförmigen Muskel» gebraucht.

bindungsmaterie dringt zwischen und um sie und hüllt sie ein».[1]) Hiernach theilt er alle Byssus in zwei Klassen, in solche mit einer Byssusrinde und in Byssus ohne diese. Die erstere von diesen theilt er wieder in zwei Unterabtheilungen: Byssus mit Fäden und Byssus ohne Fäden. Zu der ersteren davon gehört die Byssus des Mytilus edulis. Die Byssus wird nach der Meinung MÜLLERS auf folgende Weise gebildet. »Das Thier legt zuerst den zungenförmigen Muskel mit den Oeffnungen der Byssusdrüse an den Stamm der Byssus, überzieht ihn mit dem Kleber, der dann durch die ringförmigen Muskelfasern bis unten zwischen die Wurzel getrieben werden mag. Durch Zurückziehen des zungenförmigen Muskels wird der Kleber in einen Faden ausgedehnt, der der Furche des ausgestreckten Muskels an Länge gleicht. . . . . Der Faden wird von der Furche aufgenommen, weil diese gerade zwischen den beiden Anheftungspunkten des Fadens, dem Stamme nämlich und den Oeffnungen der Byssusdrüse, liegt. Er wird in ihr geformt, und endlich sein oberes Ende an einen äusseren Körper zur Befestigung übertragen. Hierbei fallen wieder die Oeffnungen der Byssusdrüse gerade auf das Ende des Fadens; aus ihnen fliesst das Sekret unmittelbar darauf und bildet die Platte zu seiner Befestigung»[2]). Die in die Byssushöhle ausgegossene Byssusmaterie wird allmählig bis zu den von der Verbindungsmaterie ursprünglich gebildeten Lamellen der Wurzel hinuntergetrieben und umhüllt sie ganz und gar[3]). Diese bestehen also sowohl aus Byssus als aus Verbindungsmaterie. MÜLLER sagt freilich von dem Mytilus[4]), er habe diese zwei Substanzen in den Lamellen der Byssuswurzel ihrer Feinheit wegen nicht unterscheiden können, aber er nimmt doch dem zufolge, was er bei verschiedenen anderen Muscheln gesehen zu haben meint, an, dass auch hier die beiden Substanzen existiren[5]).

Nach dieser kurzen Uebersicht der Ansichten MÜLLERS von der Entwickelung der Byssus und der Beschaffenheit und dem Bau ihrer Organe gehe ich zur Darstellung der Resultate, wozu ich bei der Untersuchung dieser Organe beim Mytilus edulis gekommen bin, über.

Der Fuss besteht, wie bekannt ist, beim Mytilus wie bei den Byssiferen im Allgemeinen aus einem ziemlich langen beinahe gleich dicken

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[1]) MÜLLER, Ueber die Byssus der Acephalen s. 14.
[2]) MÜLLER, angeführte Abhandlung s. 32.
[3]) MÜLLER, angeführte Abhandlung s. 34.
[4]) MÜLLER, angeführte Abhandlung s. 22.
[5]) MÜLLER, angeführte abhandlung s. 29, 30.

muskulösen Organ, das von der Bauchseite des Thieres ein wenig hinter der Mundöffnung ausgeht.

Er ist auf seiner nach unten gekehrten Seite mit einer Rinne (1 b, 2 a) versehen, die gegen seine Spitze reicht und mit einer halbmondförmigen Querspalte (1 c, 3 a) endigt. Diese Querspalte ist die Oeffnung einer wenig tiefen Höhle, gegen die untere Fläche des Fusses winkelrecht gestellt. Diese Höhle steht nur mit ihrer Mündung in Verbindung mit der Rinne, die nach dem Boden zu ein wenig weiter und mit Flimmerhaaren ganz und gar bekleidet ist. Die Hauptmasse des Fusses besteht aus Bindegewebe und Muskeln, und durch dieselbe gehen drei grössere Gefässe (2 c), wovon das mittelste am stärksten ist[1]) An den Seiten der obbemeldeten Rinne liegt die von Müller erwähnte Drüsenmasse. Der grösste Theil davon ist bei in Weingeist bewahrten Exemplaren weisslich, aber der Theil, der der Spitze des Fusses am nächsten liegt und die halbmondförmige Querspalte nach aussen begrenzt (1 d), ist grünlich, und von demselben erstreckt sich zu beiden Seiten des mittelsten Gefässes zwischen diesem und den Seitengefässen ein grünliches Drüsenband (2 e), an Dicke immer mehr abnehmend nach der Basis des Fusses zu. Ein schmäleres Drüsenband von derselben Farbe geht auch im Rande der weissen Drüse zu beiden Seiten der Rinne (2 g). Bei der Anwendung von Pikrokarmin wird der weisse Theil der Drüsenmasse intensiv roth gefärbt, während der grüne gelblich wird. Bei Färbung mit Beale's Karminlösung wird gleichfalls der weisse Theil stark gefärbt, während der grüne seine Farbe beinahe behält. Es findet sich doch keine recht starke Grenze zwichen diesen ungleichen Regionen, weil da, wo sie zusammenstossen, weisse und grünliche Theilchen unter einander gemischt sind.

Die weisse Drüse besteht aus einer grossen Menge kleinen Kolben. Jede dieser Kolben ist aus einigen Zellen gebildet (4) und verlängert sich zu einem schmalen Hals, der sich mit anderen solchen vereinigt, sich nach der Rinne zu erstreckt und da endigt. Dieser Hals muss eine Art Drüsenausführungsgang sein. Er zeichnet sich wie die Kolbe selbst durch seine körnige Structur aus. In den Wänden der Ausführungsgänge habe ich keine deutlichen Zellen entdecken können, und obgleich ich sehr starke Vergrösserungen gebraucht, habe ich doch kein Lumen in den Ausführungs-

[1]) Die oberwähnte Querspalte ist es vielleicht, die Sabbatier für die Oeffnung des Wassergefässsystemes annimmt Ann. sc. nat. T. V. Nos 1, 2 p. 51. Ich habe wenigstens keine andere Oeffnung des Fusses finden können.

gängen gefunden. Es scheint beinahe, als bestänlen die letzteren nur aus einer Verlängerung der Drüsenzellen selbst.

Die Rinne ist mit Flimmerepithelium versehen, und zwischen den Zellen des letzteren liegen die Drüsenmündungen, nur durch schmale Streifen bezeichnet, die bei starker Vergrösserung aus einer Reihe stark lichtbrechenden Körnern zu bestehen scheinen (5 b).

Der grünliche Theil der Drüse des Fusses zeigt sich mehr complicirt zu zein. Auch er besteht aus körnigen Kolben, die, so weit ich habe sehen können, von demselben Bau als diejenigen des weisen Theiles sind. Aber hier sind die Zellenkerne der dunkleren Farbe des Zelleninhalts zufolge noch schwerer zu sehen. Auch diese Kolben sind mit Ausführungsgängen versehen, die derselben Beschaffenheit als diejenigen des weissen Drüsentheiles sind; wenigstens gilt dies von den Ausführungsgängen, die in die halbmondförmige Querspalte und die Rinne ausmünden (5 c). Aber ausserdem finden sich hier eine Art lange cylindrische Schläuche (1 e, 2 f), die die beiden oberwähnten dickeren Bänder des grünen Theiles durchgehen und in die halbmondförmige Querspalte ausmünden. Bei einigen Gelegenheiten habe ich deutlich gesehen, dass solche Schläuche sich verzweigen. Die Wände dieser Schläuche werden aus einem Epithelium, dem, das die Rinne bekleidet, gleichend, gebildet, obgleich ich da Flimmerhaare nicht mit Sicherheit habe sehen können (6 a). Zwischen den Zellen dieses Epitheliums finden sich vergleichungsweise grosse körnige Klumpen, die gegen beide Enden wie Fäden schmal werden (6 b). Die in das Lumen des Kanales (6 c) von diesen Klumpen heraustretenden Fäden fliessen hier zu einer compacten Masse zusammen, die, wenn sie isolirt wird, eine Menge längere und kürzere Stücke dieser Fäden auf ihrer Fläche zeigt (7). Einige von diesen längeren Fäden, die näher an den körnigen Klumpen abgerissen worden, sind an den Enden keulenförmig angeschwollen. Die körnigen Klumpen zwischen den Epithelzellen scheinen nichts anders als der Inhalt der Drüsenausführungsgänge zu sein, die derselben Beschaffenheit als die im Epithelium der Rinne gelegenen sind, obgleich viel weiter. Sie stehen wahrscheinlich mit den tiefer liegenden körnigen Kolben im Zusammenhang, obgleich ich diesen Zusammenhang nicht deutlich gesehen habe. Ich habe auch sowohl in der halbmondförmigen Querspalte als in der Rinne Bildungen gesehen, die dem Inhalt der oberwähnten Schläuche sehr viel gleichen. Man findet da nämlich bisweilen eine mehr oder weniger dicke compacte Masse, die der Anfang eines Byssusfadens ist, wovon eine grosse Menge fädenähnliche Anhänge, denen, die dem isolirten Inhalte der Kanäle an-

hangen, gleichend, ausgehen. Diese Kanäle, mit den Falten der Rinne vergleichbar, dürften also für nichts anders als Verzweigungen der halbmondförmigen Vertiefung anzusehen sein.

Die Rinne auf der unteren Seite des Fusses öffnet sich an seiner Basis in die Höhle, die die Byssus umschliesst und von Müller die Byssushöhle genannt wird (1 g). Der tiefere Theil dieser Höhle ist durch verticale Wände, die sich in derselben Richtung als die Längenachse des Fusses erstrecken, in eine grosse Anzahl Fächer abgetheilt (10, 11, 12, 13 a). Die Wände der Höhle wie alle ihre Scheidewände sind hauptsächlich aus Bindegewebe gebildet, woran sich die Muskeln (1 l), die die Byssushöhle umschliessen, befestigen. Beinahe überall in diesem Bindegewebe wie auch zwischen den nächsten Theilen der umgebenden Muskelpartieen findet man drüsenartigen Bildungen ganz derselben Art als die der weissen Drüse des Fusses, obgleich sie sich ein wenig mehr von einander entfernen (1 k, 8). Die Mündungen dieser Drüsen habe ich freilich nicht sehen können, aber sie sind wahrscheinlich derselben Art als die Mündungen der Drüsen des Fusses. Die ganze innere Seite der Höhle, also auch die besonderen Fächer, ist nämlich wie die Rinne mit Flimmerepithelium bekleidet, obgleich die Flimmerhaare weit kleiner und nur bei sehr starker Vergrösserung sichtbar sind (11 c). Die Scheidewände werden allmählig nach aussen verdünnt und verschwinden völlig im äussersten Theile der Höhle ein wenig eher in dem nach hinten gelegenen Theile als im Vorderen und werden von erhabenen Leisten nachgefolgt. Doch habe ich nicht sehen können, ob jede dieser Leisten einer Scheidewand entspreche und eine Fortsetzung deren sei. Der Theil der Byssus, der ihre Wurzel genannt wird, liegt in den inneren Theil dieser Höhle eingesenkt (1 h). Diese Wurzel besteht aus einer Menge dünnen Lamellen (11 b), einer in jedem Fach, die völlig structurlos sind, aber ziemlich leicht in Fäden zertheilt werden können. Gegen die Mündung nähern sich die Lamellen einander, je nachdem die Scheidewände an Dicke abnehmen, und wo diese aufhören liegen sie unmittelbar an einander. Aber da die Byssushöhle gegen die Mündung an Weite abnimmt, ist es deutlich, dass die Lamellen da nicht ausgedehnt sein können, sondern auf mannigfaltige Weise, aber doch mit einer gewissen Regelmässigkeit gefaltet werden. Gerade wo die Scheidewände aufhören, werden diese aus den Fächern hervortretenden Lamellen von Anderen, die sich um sie legen, umgeben, und da die Scheidewände in dem hinteren Theile der Höhle eher als an anderen Stellen aufhören, zo zeigen sich diese neuen Lamellen zuerst gerade in diesem hinteren Theil (12 b). Je nachdem die

übrigen Scheidewände nachher verschwinden, breiten sich diese secundären Lamellen aus, bis sie die ursprünglichen vom Boden der Höhle herauskommenden Lamellen völlig umgeben und im Querdurchschnitt sich wie concentrische Ringe um diese zeigen (14 a). Dieser Theil der Byssus heisst Stamm (1 i) und erstreckt sich, wie bekannt ist, wenigstens bei grösseren Individuen weit aus der Höhle hervor. Er trägt an seinem aus der Höhle hervortretenden Theil eine grössere oder kleinere Anzahl Fäden, die beim Mytilus edulis theils an der vorderen theils an der hinteren Seite befestigt sind. Jeder dieser Fäden hängt mit einer der ebenerwähnten concentrischen Schichten zusammen und scheint damit gleichzeitig gebildet zu sein (14 a).

Was die Fäden selbst betrifft, scheint es, als bestänen sie aus einer ganz homogenen Substanz, aber ihre Fläche wird eigenthümlich genug von Karmin nicht gefärbt, während ihre Durchschnitte diesen Färbestoff begierig aufnehmen. Bei der Anwendung von Pikrokarmin wird die Fläche dieser Fäden gelb gefärbt. Die Byssusfäden können wie die Lamellen der Wurzel und des Stammes in feine Fäden zertheilt werden. Das äussere Ende der Byssusfäden ist ein wenig geplättet und an fremden Gegenständen befestigt.

Was die Bildung der Byssus betrifft, dürfte diese auf eine ganz andere Weise als die von MÜLLER angegebene geschehen. Erstens ist seine Annahme, dass die im Fusse gelegene Drüse durch sieben Oeffnungen der Querspalte am Ende der Rinne des Fusses ausmünde, so weit ich finden kann, ganz und gar unrichtig. Wie ich im Vorhergehenden gezeigt habe, mündet nur ein kleinerer Theil der Drüsenmasse des Fusses in die halbmondförmige Querspalte aus, und es dürfte unmöglich sein die Mündungen der oberwähnten Schläuche, die da sich öffnen, mit Lupe zu rechnen. Der ganze weisse Theil der Drüse des Fusses und ein Theil des grünlichen liefern dagegen ihr Sekret in die Rinne selbst, und man kann darum mit grosser Sicherheit annehmen, dass die Hauptmasse des Fadens daraus gebildet sei.

Da aber die Rinne sich in die Byssushöhle unmittelbar öffnet, und die Wände der Byssushöhle Drüsen ganz derselben Art als die Wände der Rinne enthalten, so dürfte es deutlich sein, dass die so genannten Rindenschichten auf ganz dieselbe Weise als der mit ihnen zusammenhangende Faden und damit gleichzeitig, also durch Sekret, von den herumliegenden Drüsen abgesondert, gebildet werden.

Auch die verticalen Lamellen, die die Wurzel ausmachen, werden gewiss auf dieselbe Weise aus den Drüsen der verticalen Scheidewände gebildet, und gerade, wo diese Scheidewände aufhören, fängt die Absonderung der ebenerwähnten Rindenschichten an. An der Grenze selbst von den

Wurzellamellen und den Rindenschichten fliessen diese mit einander zusammen. Die im Stamme befindlichen gefalteten Lamellen, die eine Fortsetzung der Wurzellamellen sind, können nicht anwachsen, da keine absondernden Drüsenwände sich zwischen ihnen finden.

Die ganze Byssus scheint also beim Mytilus von hauptsächlich auf gleichartige Weise gebildeten Drüsen abgesondert und in Formen, aus der Byssushöhle mit ihren Fächern und der Byssusrinne mit ihren Furchen gebildet, gegossen zu werden. Die Byssusdrüse, die Müller nur an den Fuss verlegt hat, umfasst also eine Menge drüsenartige Organe sowohl im Fusse als in den Wänden der Byssushöhle.

Dass eine solche Absonderung an den oberwähnten Stellen wirklich Statt findet, davon kann man sich leicht überzeugen. Man braucht nur einen dünnen Schnitt durch die Wand der Rinne oder Höhle bei einem lebenden Individuum machen, und man wird mit starker Vergrösserung unter den Flimmerhaaren eine Menge grössere und kleinere Kugeln von Sekret finden, die durch schmale Fäden an den Wänden befestigt sind und bei der Bewegung der Flimmerhaare sich hin und her schwingen. Manchmal habe ich auch solche Kugeln losgerissen gesehen, die durch mehrere noch zurück bleibenden Ausläufer zeigen, das sie durch den von mehreren Drüsenmündungen zusammengeflossenen Inhalt entstanden sind.

Sowohl der Stamm als die Lamellen der Wurzel sind, so weit ich habe sehen können, an die Wände der Höhle nirgends angewachsen, sondern die ganze Byssus ist in dieser Höhle frei aufgehängt, von allen Seiten von Wasser, die durch die Flimmerhaare bewegt wird, umspült. Da aber die Wurzel viel weiter als der Stamm, und der Raum zwischen den Lamellen und den Scheidewänden äusserst unbedeutend ist, sitzt doch die Byssus sehr sicher befestigt und kann bei einem gesunden Individuum nicht ausgezogen werden, ohne dass dieses zerrissen wird. Der Zuwachs der Byssus geschieht dadurch, dass, da die Lamellen der Wurzel durch den Zufluss von Sekret verlängert werden, ihre obersten Theile in der Byssushöhle länger emporragen, und je nachdem neue Theile davon den Punkt passiren, wo die Scheidewände aufhören, werden sie also in Stamm verwandelt. Darum sagt Réaumur nicht ganz unrichtig, der Byssusstamm wachse von unten nach Art eines dicken Haares hervor [1]).

Da, wie ich im Vorhergehenden zu zeigen versucht habe, die Wurzel sich auf dieselbe Weise als die übrigen Theile der Byssus entwickelt, und

[1]) Müller, angeführte Abhandlung, s. 6.

da ich nicht die geringste Spur von zwei ungleichen Arten von Substanz in den Lamellen der Wurzel habe finden können, scheint es mir, man habe keine Ursache zu behaupten, es finden sich beim Mytilus die zwei von MÜLLER so viel besprochenen Substanzen, die Verbindungsmaterie und die Byssusmaterie, wenn man nicht nachweisen kann, dass diese beiden Arten von Substanz bei anderen Byssiferen deutlich vorkommen.

Dagegen dürften die Substanz, die in den grünen und diejenige, die in den weissen Theilen der Drüse des Fusses hervorgebracht werden, von einander ein wenig abweichen, aber est ist mir noch nicht gelungen völlig darzulegen, wie diese Substanzen sich zu einander verhalten. Es ist doch deutlich, wie im Vorhergehenden gesagt ist, dass die Hauptmasse des Byssusfadens aus Sekret von dem weissen Theile der Drüse des Fusses gebildet wird. Es ist möglich, dass die Absonderung von dem grünen Theile keine andere Aufgabe hat als den Faden und den nächsten Theil des Stammes mit einer äusserst dünnen Hülle, die vielleicht fester ist und äusseren Einflüssen besser widersteht, zu überziehen. Dieses scheint dadurch wahrscheinlich, dass die Fläche der Fäden und der Theil des Stammes, der ausserhalb der Byssushöhle liegt, von Pikrokarmin gelb gefärbt werden gleichwie die Kolben der grünen Drüse, während die Durchschnitte der Fäden und des Stammes wie auch die Fläche des Stammes unten in der Byssushöhle intensiv roth gefärbt werden wie die Drüsenzellen in den Wänden der Byssushöhle und die Kolben im weissen Theile der Drüse des Fusses. Wenn aber eine solche äussere Schicht vorkommt, muss sie äusserst dünn sein.

Ich hatte in diesen Aufsatz auch einige Vergleichungen zwischen der Byssus des Mytilus und anderen davon mehr oder weniger abweichenden Formen einführen wollen, und ich habe zu diesem Zweck eine Menge Untersuchungen angestellt, da aber diese noch nicht abgeschlossen worden sind, muss ich ihre Veröffentlichung bis auf weiter verschieben. So viel kann ich doch schon jetzt sagen, dass ich bei den von mir untersuchten Formen noch nichts gefunden habe, das den von mir in diesem Aufsatze von der Bildung des Byssus ausgesprochenen Ansichten widerstreitet.

Erklärung der Abbildungen.

Fig. 1. Verticalschnitt des Fusses und der Byssushöhle; *a*, der Fuss; *b*, die Rinne; *c*, die halbmondförmige Querspalte; *d*, ein Stück der grünen Drüse; *e*, Schläuche darin; *f*, der mittelste Gefässstam; *g*, die Byssushöhle; *h*, die Wurzellamellen der Byssus; *i*, der Stamm; *k*, die Drüsen der Byssushöhle; *l*, Muskeln.

Fig. 2. Querschnitt des Fusses; *a*, die Rinne; *b*, Muskeln; *c*, Gefässe; *d*, der weisse Drüsentheil; *e*, die zwei tiefer gelegenen grünen Drüsenbänder; *f*, in die Quere abgeschnittene Schläuche; *g*, die zwei bei der Rinne gelegenen grünlichen Drüsenbänder.

Fig. 3. Horizontaler Schnitt der halbmondförmigen Querspalte; *a*, die Querspalte; *b*, die Rinne.

Fig. 4. Einige Kolben des weissen Drüsentheiles.

Fig. 5. Ein Stück eines Querschnittes der Rinne; *a*, das Flimmerepithelium; *b*, Ausführungsgänge des weissen Drüsentheiles; *c*, Ausführungsgänge des grünen Theiles; *d*, Kugeln von Drüsensekret.

Fig. 6. Querschnitt eines Schlauches der grünen Drüse; *a*, Epithelium; *b*, körnige Klumpen; *c*, das Lumen mit seinem Inhalt.

Fig. 7. Der isolirte Inhalt eines solchen Schlauches.

Fig. 8. Einige Drüsen der Byssushöhle.

Fig. 9. Kugeln von Drüsensekret zwischen den Flimmerhaaren der Byssushöhle.

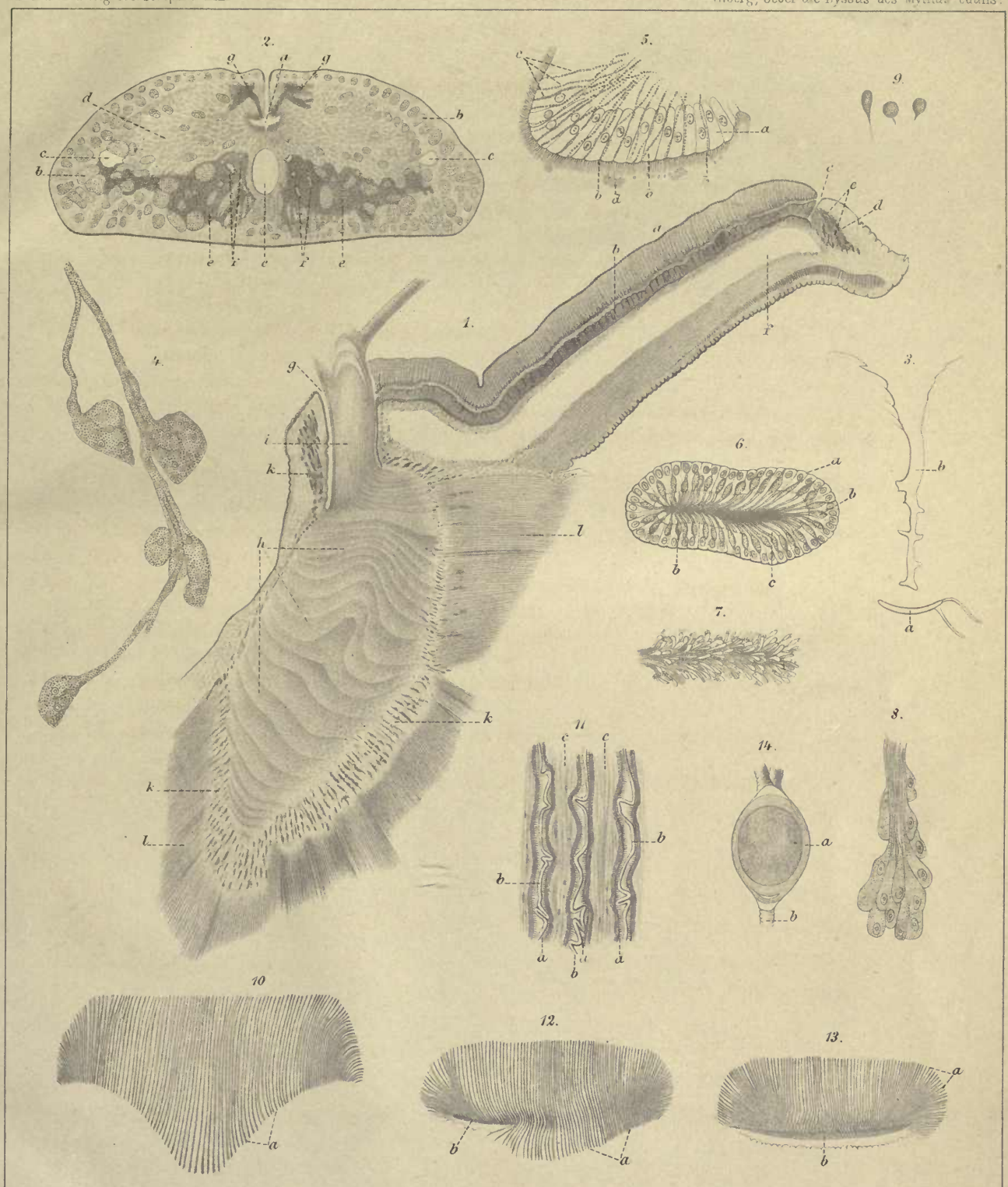
Fig. 10. Querschnitt der Byssushöhle nahe am Boden; *a*, die Fächer.

Fig. 11. Ein Stück desselben Schnittes, stärker vergrössert; *a*, Fächer; *b*, Lamellen; *c*, Scheidewände mit Flimmerhaaren.

Fig. 12. Querschnitt der Byssushöhle nahe an der Mitte; *a*, die Fächer; *b*, anfangende Rindenlamellen.

Fig. 13. Querschnitt der Byssushöhle näher an der Mündung; *a*, die Fächer; *b*, anfangende Rindenlamellen.

Fig. 14. Querschnitt des Stammes; *a*, Rindenlamellen; *b*, Basis eines Byssusfadens.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